

2012 RCRA Corrective Measures Implementation

Status Report

October 2013 Rev. 1 – April 2014

Prepared for:

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Abbreviations

DCA 1,2-Dichloroethane

DCE 1,1-Dichloroethene

IEPA Illinois Environmental Protection Agency

MCL Maximum Contaminant Limit, U.S. EPS groundwater standard

NPDES National Pollution Discharge Elimination System

PCE Tetrachloroethene

P&T Pump & Treat

RCRA Resource Conservation and Recovery Act of 1976

RFI Remedial Facility Investigation

TCA 1,1,1-Trichoroethane

TCE Trichloroethene

ug/L Micrograms per Liter

VOCs Volatile Organic Chemicals

1.0 INTRODUCTION

1.1 BACKGROUND

The Central Wire Union Plant (formerly known as Techalloy) is located in Union, Illinois on the northwest corner of the intersection of Jefferson and Olson Roads. The plant facility and grounds occupy 5 acres. The company owns the surrounding 38 acres including the plant site. See Figure 1-1 for site location.

Central Wire began operating at this facility in 1960 as Techalloy Company, Inc. Prior to 1960, the property was farm land. Techalloy was acquired by Central Wire in 2005. Since 1960 Techalloy, now Central Wire, has been operating as a specialty handler of stainless steel wire products. The finished products are stainless steel wire coils of varying diameters and tensile strengths that are distributed with and without specialty coatings.

In the 1960s and 1970s a part of the process was the cleaning of the stainless steel wire using solvents, primarily trichloroethene (TCE) and trichloroethane (1,1,1-TCA). In those days, when the solvent was no longer useful, it was disposed of on site. The source area for the chlorinated groundwater plume that eventually was created is near the east end of the north boiler room which is attached to the northeast corner of the Acid House. The chlorinated plume travels with the groundwater which flow in a northwesterly direction.

As result of these activities and after determining there was a chlorinated groundwater plume, Central Wire entered into an Order on Consent with the U.S. Environmental Protection Agency to design, build and operate a groundwater extraction and treatment facility to remove a chlorinated solvent plume from the groundwater downgradient (northwest) of the Central Wire facility and to address the source area east of the North Boiler Room.

As part of the Corrective Measures Implementation under RCRA, Central Wire designed, constructed and is operating a groundwater pump and treat system (P&T) to remove volatile organic compounds from the groundwater including an extraction well (EW-1), a packed tower aerator, piping and a building to house the appurtenant equipment (holding tanks, pumps, meters, electrical systems and the like). Subsequent to the initiation of operations, it was determined that the single extraction well was not capturing the west edge of the chlorinated plume. As a result, Central Wire added a tray aeration system to treat additional groundwater pumped from a new well, extraction well no. 2 (EW-2), located west of EW-1; see Figure 1-2 for location of all wells pertinent to this Status Report.

To operate this facility, Central Wire applied for and received an NPDES discharge permit from the Illinois Environmental Protection Agency (IEPA) to discharge the treated water to the South Branch of the Kishwaukee River. This system has been in continuous operation since 1995 except for minor shutdowns for maintenance and repair.

To address the source area, Central Wire designed, constructed and is operating a soil vapor extraction (SVE) system and an air stripping system. The soil vapor extraction system removes volatile organic compound vapors in the soils above the water table (the vadose zone).

The air stripping unit blows air into the soil below the water table and as the fine air bubbles rise to the top of the groundwater table, they strip entrained volatiles from the soil and they enter the vadose zone where they can be captured by the SVE system.

This system has been effective in reducing the contamination on the source area but some contamination still exists since EPA's Maximum Contaminant Limits for some chlorinated compounds are still exceeded in the RCRA Groundwater Monitoring Well Network (see Section 2-2, below). The chlorinated plume extends downgradient from the source area about 1.4 miles and is about 1,500 feet wide.

Overall, between source reduction and groundwater extraction and treatment, the levels of chlorinated solvents detected in the groundwater have gone down on site and have degraded into daughter products that are more typically seen in the extraction well and downgradient well DGW-1. These daughter products include 1,1-dichloroethene, 1,2-dichloroethane and vinyl chloride. As an example vinyl chloride was first detected in DGW-1D in June 2013 and by the December sampling it had increased showing that the degradation cycle is nearing completion primarily through reductive dechlorination.

This Status Report will cover three topics after describing the regional hydrogeology:

- Performance of the P&T system including influent groundwater concentrations.
- RCRA groundwater monitoring network and residential well sampling.
- Determining the leading edge of the chlorinated plume.

1.2 REGIONAL HYDROGEOLOGY

Groundwater is obtained from four major aquifer systems in northeastern Illinois — glacial drift, shallow bedrock, and two divisions of the deep bedrock. The glacial drift aquifer system is restricted to the unconsolidated materials overlying the bedrock; more specifically, to the sand and gravel beds. The shallow bedrock aquifer system consists of those bedrock units that directly underlie the glacial drift and are recharged locally by precipitation. The major units in the system are the Silurian age dolomite and the Maquoketa shale and dolomite. The Silurian age dolomite yields the most water of the units and is present in the eastern half of McHenry County. The Maquoketa shale and dolomite underlies the Silurian dolomite in the eastern part of the county and directly underlies the glacial drift in the western portion of the county. The Maquoketa group separates the shallow bedrock aquifer system from the underlying deep bedrock aquifer systems. The shale beds of the Maquoketa group are relatively impermeable and, where present (i.e., beneath the Central Wire facility), these beds act as a confining layer above the deep bedrock aquifer systems.

The two deep bedrock aquifer systems are the Cambrian-Ordovician and the deep Cambrian. The Cambrian-Ordovician is comprised of the Glenwood St. Peter and Ironton Galesville sandstones. The deep Cambrian aquifer is the Mt. Simon sandstone, which overlies the Precambrian crystalline rock. A figure showing a generalized column of rock stratigraphic unit in McHenry County is provided in Attachment 1.

Previous studies at the Central Wire facility have determined that groundwater occurs

approximately 9 feet below ground surface (bgs) within the sand and gravel deposits. The sand and gravel unit is the underlying aquifer.

The sand and gravel unit extends from near ground surface to 35 feet bgs at the facility. At the northwest corner of the Central Wire property and beyond, the sand and gravel unit extends from near ground surface to 85 feet bgs. Immediately below the sand and gravel is the silty clay Marengo till. The upper boundary of the Marengo till constitutes the lower boundary of the sand and gravel aquifer. The Marengo till is approximately 80 feet thick in proximity to the facility and is underlain by the Maquoketa shale.

Groundwater within the sand and gravel flows northwesterly as shown on Figure 5-1. The hydraulic gradient between existing monitoring wells MW-1 and MW-9 has been measured at 2.3 x 10³ ft/ft.

An 8-hour constant discharge rate pumping test was conducted on 21 May 1993 in a 6-inch diameter groundwater well previously installed on the southeast corner of the Techalloy property. This location is upgradient of the plume with respect to groundwater flow. A single temporary observation well located 10 feet from the extraction well was used to measure water table drawdown resulting from the pumping test. Hydrogeological data were collected for the following parameters:

- Transmissivity
- Hydraulic conductivity
- Aquifer saturated thickness
- Recharge
- Water level elevations

During the pumping/drawdown phase of the pumping test, the water level changes in the pumping and observation wells were 2.39 and 0.41 feet of their original water levels, respectively. After completion of the recharge phase of the pumping test, water levels within the pumping and observation wells had returned to within 0.06 and 0.04 feet of their original water levels, respectively. Plume downgradient was virtually unaffected during the pumping test.

The test evaluation indicated that the mean transmissivity of the water table aquifer in the area is 7,800 ft²/day. Based on a measured aquifer saturated thickness of 30 feet, the hydraulic conductivity of the aquifer is approximately 260 ft/day.

2.0 PERFORMANCE OF THE P&T SYSTEM

The Central Wire groundwater extraction and treatment system was originally modeled and designed with only one 350 gpm extraction well to capture the chlorinated plume. That system was reviewed and approved by EPA throughout the Remedial Facility Investigation, Corrective Measures Study (CMS) and Remedial Design phases. After implementation and after operations began, volatile organic compounds were detected in the original sentinel wells, DGW-1S, DGW-1I and DGW-1D. While Central Wire had shown that the original extraction well would capture the chlorinated plume, there was some concern that the plume was moving past the west side of the plume. As a result a second extraction well, also fitted with a 350 gpm pump, was placed about 700 feet cross gradient and west of the first extraction well. An aquifer performance evaluation letter report as well an updated capture plume drawing is provided in Attachment 2. This information shows that the two extraction wells are capturing the entire plume.

The original NPDES discharge permit requires reporting of three volatile organic compounds (VOC's) for which the Illinois Environmental Protection Agency (IEPA) has specified effluent These VOC's are trichloroethene (TCE), tetrachloroethene (PCE) and limitations. 1.1,1-Trichloroethane (TCA), each with daily maximum limits of 20 ug/L. "This is still being the eDMR as 1,1,1-Trichloroethane, Trichloroethane misreported Tetrachloroethane, respectively. Since Central Wire cannot change the eDMR reported chemicals, a permit modification was requested of IEPA to correct the permit on December 5, 2013 to change it back to the original permit which set permit limitations and reporting requirements on 1,1,1-Trichloroethane, Trichloroethene and Tetrachloroethene. Central Wire has been informed by IEPA staff that the modification is ready to be issued, but as of this writing, it has not been received.

Central Wire began sampling the influent groundwater quality in 2007. The influent was sampled at the P&T facility after groundwater from extraction wells no. 1 & 2 were combined. These samples were collected quarterly and were only analyzed for the VOC's for which there were effluent limitations (TCE, PCE and TCA). Figure 2-1 shows the average influent concentrations in ug/L from March 2007 through December 2013. TCE and TCA are generally trending downward while PCE has been averaging about 14 ug/L.

In June 2009, Central Wire began sampling influent groundwater individually from each well, but again only for the VOC's that had effluent limitations. In March of 2013, Central Wire began analyzing for all VOC's that could be detected by EPA Method 8260B. Four sampling rounds that have occurred since that time at the two wells (March, June, September and December 2013). Three additional VOC's were found in EW-1 – 1,1-DCE, 1,1-DCA and cis-1,2-DCE. There are MCLs for 1,1-DCE and cis-1,2-DCE and neither were exceeded in March 2013. There is no MCL for 1,1-DCA.. In June 2013 in EW-1 the same three additional VOCs were detected and 1,1-DCE was detected at 7.3 ug/L, above the MCL of 7 ug/L. In September 2013, the same three additional VOCs were detected. 1,1-DCE was detected above the MCL at 9.8 ug/L. and cis-1,2-DCE was detected above the MCL of 70 ug/L at 80 ug/L. In December 1,1-DCE was again above the MCL at 9 ug/L, but cis-1,2-DCE was below the MCL. The three

compounds are degradation products of TCE, so the TCE has at least begun the degradation process by the time it has traveled about 0.75 miles downgradient.

In EW-2, the same additional three VOCs were detected in all four samples and they were below the MCLs except for December 2013 when 1,1-DCE exceeded the MCL of 7 ug/L at 16 ug/L.

The data and plots for the VOC trends in extraction wells no. 1 & 2 (EW-1 & EW-2) are provided in Figures 2-2 and 2-3. The three VOC concentrations with discharge concentration limitations in well no. 1 (TCA, TCE and PCE) have been generally trending downward since March 2011 with the most significant decreases between March and September 2011. While the trends have flattened out since September 2011, they are still trending downward. TCE has dropped from 16 ug/L in September 2011 to 12 ug/L in December 2013; PCE was below the MCL of 5 ug/L between September 2011 and September 2013. In December 2013 11 ug/L were detected. TCA has never been above the MCL.

The TCA concentrations have always been below the MCL in extraction well no. 2, but had generally been increasing through December 2012 and have been decreasing down to 4.5 ug/L in December 2013. PCE concentration also had been trending upward (through September 2011) but has leveled off at about 35 ug/L. TCE concentrations have been relatively stable, at around 25 ug/L, however, in December TCE was detected at 8.9 ug/l.

Each well pumps about half of the total water processed in the pump and treat facility. Neither of the extraction wells are metered. Since September 2004 each pump delivered, on average, 390,000 gallons per day for an average total of 780,000 gallons per day over the past ten years. Pumping records are provided in Table 2-1

In evaluating the overall performance (efficiency) of the P&T system, the influent concentrations of the VOC's (with effluent limitations) were compared to the corresponding effluent concentrations. In three 2013 sampling events (in March, June and September), the average influent concentrations were 16, 13, and 24 ug/L for TCE, PCE, and TCA, respectively. The corresponding average effluent concentrations in these three months were 0.74, 0.17 and 0.317 ug/L. The P&T system achieved removal efficiencies of 95.4%, 98.7% and 98.7%, respectively, for the three VOCs.

When these effluent values are compared to the daily maximum NPDES permit effluent limitation of 20 ug/L for each of the three volatiles, the effluent values are 3.7%, 0.85% and 1.6% of the allowable maximum daily effluent concentrations.

This analysis shows that that the P&T system at Central Wire remains extremely effective 18 years after the P&T system started treating groundwater.

3.0 RCRA GROUNDWATER MONITORING NETWORK AND RESIDENTIAL WELL SAMPLING

The basic RCRA groundwater monitoring network was established prior to or during the Remedial Facility Investigation (RFI) in 1993 and 1994. In the post- RFI time frame, samples were collected in most wells in 1998 and 2002. In 2003, Central Wire began collecting and analyzing semiannual samples from the RCRA groundwater well monitoring network and plan to continue this practice in the future.

The original RCRA groundwater monitoring well network has been expanded over time and now includes the following wells.

MW-2	MVV-4	MVV-5	MW-5D	MVV-6
MW-7	MVV-8	MW-9	MW-HBR	DGW-1S
DGW-1I	DGW-1D	DGW-2S	DGW-2I	DGW-2D

EPA has requested well construction information. This information can be found in Attachment

- 3. The downgradient well nest (DGW-1S, DGW-1I and DGW-1D) details are not in Attachment
- 3. The wells were constructed after MW-2 through MW-HBR and well construction information has not been located. They are, however constructed of similar material and the depth of water and total well depth of the wells can be found on the CD accompanying this report.

Where VOC's have exceeded the maximum contaminant levels (MCL's) at any point in the monitoring process for a specific monitoring well, the significant VOC data has been plotted over time and is shown in Attachment 4. Only one of these wells did not exceed the VOC MCL's in any sampling event – DGW-1S. VOC data for that well is shown in Table 3-1.

In analyzing the groundwater from downgradient well nest DGW-1 over the years, it has been noted that some of the plume may have migrated beyond the capture zone before the treatment facility was put into operation in the 1995. As a result, since 2007 Central Wire has been sampling up to eight residential wells and the well believed to be the closest downgradient well to the leading edge of the chlorinated plume - the South Branch Nursery irrigation well on the northwest side of their property. See Figure 1-2 for the monitoring, residential and irrigation well locations that have been sampled by Central Wire, including the residential well samples for homes along Illinois Route 176 and one home on Highbridge Road. Note: Neither the Central Sod irrigation wells nor the Village of Union Municipal water supply wells have been sampled by Central Wire.

Note: The Non-responsive well was a shallow well that was sampled up through December 2010. Near that point in time the Non-responsive replaced their sand point well with a drilled and cased well and that well has not been sampled since then, per their request.

The municipal water wells are side gradient to the flow in the chlorinated plume. They have

not been sampled by Central Wire. Well No. 1 is located 3,000 feet from the source area at Central Wire and Well No. 2 is 2,700 feet from the source area. Well No. 1 is 760 feet deep and was completed in the St. Peter Sandstone in the Cambrian-Ordovician aquifer system and Well. No. 2 is 192 feet deep and was completed in the Maquoketa Group in the Cambrian-Ordovician aquifer system.

The residential wells are all completed in the sand and gravel aquifer between 60 and 100 feet deep according to the residents.

The residential wells identified in Figure 1-2 have been sampled to confirm that they have not been impacted by the chlorinated plume. To date (through December 2013), there have been no detections of chlorinated solvents in any of the residential wells or in the South Branch Nursery irrigation well. In addition a relatively new well nest, DGW-2 (constructed in 2010), is being used as the sentinel well. DGW-2, a three well nest with wells completed at 27 feet, 57 feet and 85 feet below ground surface, was sampled in June and December 2011, 2012 and 2013. There have been no VOC detections in samples collected at this well nest. See the December analytical results in the CD sent with this report.

An analysis of the data trends in the RCRA monitoring well network is provided here as a summary for this Status Report. Plots and tables for these wells are provided in Attachment 4.

MW-2 has had sample results that have been below the MCL's for 13 sampling events in a row over six years going back to March 2008. There have been minor detections of TCE in December 2012 and PCE since December 2010, but all have been below the MCL.

<u>MW-4</u> has exceeded the MCL's for TCE, PCE, 1,1-DCA and total 1,2-DCE in the past, including June of 2009. But since then it has only exceeded the TCE and PCE MCL's except for December 2012 and June and December 2013 where only the PCE MCL was exceeded.

MW-5 has, in the past, exceeded MCL's for TCA, TCE, PCE and DCE. However, in the last 17 sampling events over 8½ years going back to June 2005 MW-5 has only exceeded the PCE MCL. That concentration has decreased from 210 ug/L in December 2003 to 72 ug/L in December 2013.

<u>MW-5D</u> has exceeded MCL's for TCE and PCE. While TCE concentrations rose from 1995 through 2003, since December 2005 (14 sampling events), only the TCE MCL has been exceeded and it has decreased from 47.5 ug/L in December 2005 to 18 ug/L in December 2013.

Only PCE has exceeded MCLs at MW-6. PCE values in MW-6 have gone from 36 ug/L in June 1995 to under the MCL at 1.8 ug/L in December 2013.

<u>MW-7</u> MCL's have been exceeded for TCE, PCE and DCE. The DCE MCL has not been exceeded since June 2003, in June 2013, only the PCE MCL was exceeded and in December 2013 neither were exceeded. PCE has gone from a high of 200 ug/L in

December 2006 to 1.8 ug/l in December 2013, below the MCL for PCE of 5 ug/L. TCE has been below the MCL in both 2013 rounds of sampling at MW-7.

MCL's for TCE and PCE have been exceeded at MW-8. They have come down from highs of 34 ug/L for TCE and 200 ug/l for PCE to 6.9 and 72 ug/L, respectively, in December 2013..

The only MCL exceeded at MW-9 was PCE which was 23 sampling events ago (in April 2002) and there were no detections in the past three rounds of sampling.

The only MCL exceeded at MW-HBR is PCE. It has reduced from a high of 130 ug/L in December 2003 to 48 ug/l in December 2013 and overall it has been stable since June 2004.

The only other wells that exceeded the MCL's were DGW-1I and DGW-1D (there have been no detections above the MCL's in DGW-1S). DGW-1I has exceeded MCL's for DCE, TCA, TCE, DCA and PCE. The last time the DCA and PCE MCL's were exceeded was December 2005 and April 2002, respectively. DCE has gone from 6 ug/L in February 1998 up to 120 ug/L in June 2012 and has trended down in the past three rounds of sampling to 28 ug/L in December 2013. Likewise TCA has gone from 0 ug/L in February 1998 to 710 ug/L in June of 2012 and has trended down over the last three sampling rounds to 150 ug/L in December 2013. Lastly, TCE has gone from 4 ug/L in February 1998 to 110 ug/L in December 2009 and trended down to 26 ug/L in December 2013.

DGW-1D has had MCL exceedances for 1,1-DCE, 1,2-DCA, TCE and Vinyl Chloride. 1,1-DCE has gone from a high of 98.4 ug/L in December 2005 to 3.7 ug/L in December 2013. TCE is variable. It was at 4 ug/L in February 1998, went up to 110 ug/L in December 2009, down to 0.67 ug/L in June 2013 then back up to 26 ug/L in December 2013.1,2-DCA has been below the MCL since June 2006. DCA and DCE are degradation products which shows that TCA and TCA do degrade over time and distance. Vinyl Chloride is also a degradation product. It was not detected before June 2013 at (8.1 ug/l) and in December it increased to 13 ug/L.

Overall, there is a downward trend in VOC concentrations in all (near plant) monitoring wells and downgradient well no. I (DGW-1S, DGW-1I & DGW-1D). There have been no VOC detections in any of the residential wells nor the South Branch irrigation well since sampling began in 2007. There have been no detections in the sentinel well nest (DGW-2S, DGW-2I & DGW-2D) since sampling began in June 2011. See the attached CD for the December 2013 RCRA monitoring well and residential well analytical report.

The Central Wire Union Plant will continue to sample the wells in the RCRA Monitoring Well Network, residential wells along Illinois Route 176, the South Branch Nursery irrigation well and the new sentinel wells, designated as DGW-2S, DGW-2I and DGW-2D on a semiannual basis for VOC's (see Figure 1-2 for the locations of the DGW-1 and DGW-2 well nests). These samples will be collected after the field parameters (dissolved oxygen,

conductivity, pH and oxygen reduction potential) have stabilized.

The December 2013 sampling event was conducted on December 10 & 11, 2013. Central Wire has updated the potentiometric surface map of the groundwater elevations across the chlorinated plume downgradient (moving in a northwest direction) of the plant site based on water elevations collected in June 2013. This is shown on Figures 5-1 to 5-5.

4.0 DETERMINING THE LEADING EDGE OF THE CHLORINATED PLUME

Central Wire has been identifying the leading edge of the chlorinated plume northwest of the Union Plant on essentially an annual basis since 2007, along with semiannual sampling of up to seven residential wells and one irrigation well in order to assure that the residential wells downgradient of the plume are protected. The leading edge of the chlorinated plume is on the South Branch Nursery property about 800 feet southeast of the South Branch Nursery irrigation well and about 1,000 feet from the nearest residential well.

Groundwater transport modeling conducted in 2007 and 2008 (Conceptual Site Model, Groundwater Contamination Plume, Central Wire Plant, Union, Illinois, Matrix Environmental, Inc., May 2008) predicted that the chlorinated solvents in the plume would degrade before reaching residential wells.

In 2007 Central Wire began a periodic evaluation of the location of the leading edge of the chlorinated plume. The general location is on the South Branch Nursery property. The owners, Goodmark Nurseries LLC gave Central Wire permission to investigate to determine where the leading edge of the plume is, but asked that Central /wire not place any permanent monitoring wells on their property. As a result, Central Wire has used direct push technology using Geoprobes to push a pump to the desired levels to collect samples. These investigations were conducted in 2007, 2008, 2010, 2011 and 2012. The geoprobe location have a prefix of GP.

While Central Wire found no chlorinated compounds above EPA's Maximum Contaminant Limits (MCL's) at what Central Wire estimated was the leading edge of the plume in 2012 at GP-18 (see Figure 5-1), the company wanted to ensure that it took all reasonable actions to protect the residential drinking water supply for the residences along Illinois Route 176 downgradient from the chlorinated plume and as a result undertook the 2012 Geoprobe sampling event to again define the leading edge of the chlorinated plume. This will be done again in 2014.

Based on previously calculated rates of plume movement (approximately 125 to 130 feet per year — this is a Central Wire estimate based on the distance from the plant to the leading edge of the chlorinated plume and the time frame for the on site disposal of the chlorinated solvents) and assuming GP-18 is at the leading edge of the plume, it is estimated that it would take six years (830¹ ft/130 ft/yr = 6.4 yrs) until the chlorinated plume reached the South Branch Nursery irrigation well; up to 8 years before reaching the well at the home on the south side of Route 176 in front of the nursery (approx. 1,050 ft) (aka the Bolanos well, now Rusho); and 10 years before it reached the closest residential well on the north side of Route 176 (Logothetti) (1330 ft/130 ft = 10.23).

4.1 2012 RCRA CORRECTIVE MEASURES IMPLEMENTATION FIELD INVESTIGATION

The goal of the 2012 RCRA Corrective Measures Implementation Field Investigation was to identify the leading edge of the chlorinated plume.

The objectives of the 2012 field investigation were to:

- a) Assure Central Wire, U.S.EPA, local residents and any additional stakeholders that the public is being protected, i.e., chlorinated VOC compounds are not reaching the drinking water wells downgradient of the chlorinated plume, and
- b) Learn more about the characteristics of the aquifer and the interaction of the plume with the environment by collecting additional data that is outlined below.

The 2012 CMI Field Investigation Work Plan was approved by U.S. EPA in October 2012. The Field Investigation was initiated on October 15, 2012 and was completed on October 18, 2012. The Field Investigation included the following tasks:

a) Perform groundwater sampling to locate the leading edge of the chlorinated solvent plume. This was done using direct push technology to collect samples on the South Branch Nursery property as was done in in prior years to locate the leading edge of the chlorinated plume. See Figure 1-2 and 5-6 for the Geoprobe locations.

In 2012, as in past years, samples were collected at three depths at each of eight Geoprobe locations - at 27 feet, 57 feet and 85 feet deep. At two 85 feet deep locations (GP-17 and GP-19) silt clogged the bladder pump. At these two locations the Geoprobe stems were raised to 80 feet so samples could be collected.

This field investigation included two sample locations that Central Wire believed would be at the leading edge of the chlorinated plume: GP-18 and GP-22. There were only minor amounts of the chemicals of concern in GP-8S in 2011. The chemicals of concern are trichloroethene (TCE), perchloroethene (PCE) and their degradation products. Central Wire also collected samples at the same locations that Geoprobe samples were collected in the 2009/2010 and 2011 field investigations. These locations included GP-3, GP-8, GP-16, GP-17, GP-19 and GP-20 (see Figure 5-6). GP-16 to GP-20 were resampled again since there was no to minimal detections (and none above groundwater Maximum Contaminant Limits) at these locations in the 2009/2010 or the 2011 investigations.

All samples were collected using standard low flow sample collection techniques following ASTM D6771 "Standard Practice for Low-Flow Purging and Sampling". Irrigation and residential wells were sampled by purging three water column volumes from the well prior to sampling. Field parameters were collected by using a YSI 556 sonde water quality monitoring device. The sample analytical results are provided in Table 4-1. The 2012 well stabilization data for all Geoprobe locations are provided in the attached CD.

b) Central Wire personnel have been attempting to correlate the Central Sod

irrigation well pumping to the water levels in monitoring well DGW-2I by monitoring and logging the hours pumped each week by the irrigation wells on the Central Sod property and comparing this pumping to the water levels recorded every 15 minutes in DGW-2I with a data logger. Central Wire has also been comparing the groundwater elevations to local precipitation as reported by the National Weather Service at Marengo, IL. This has been evaluated for three growing seasons and the variability in the elevation of the groundwater table seems to be directly tied to the amount of precipitation in the area and does not seem to be impacted by the Central Sod irrigation wells. Recently, Central Wire has started plotting the groundwater elevations from the data logger in DGW-2I as a part of the RCRA Monthly Progress Report and adding to the x-axis the date and quantity of rainfall events and the hours per week that the Central Sod irrigation wells were pumped. An example of these plots for October 2013 is provided in Figures 4-2 and 4-3.

All samples in the 2012 RCRA CMI Field Investigation that were collected from fixed and temporary wells were collected using low flow sample collection techniques following ASTM D6771 "Standard Practice for Low-Flow Purging and Sampling". Irrigation and residential wells will be sampled by purging three water column volumes from the well prior to sampling. Field parameters were collected by using a YSI 556 sonde and display water quality monitoring device.

All samples were analyzed for volatile organic compounds by EPA Method 8260B. Geoprobe equipment was provided by Geoserve, Inc., Woodstock, IL. Geoprobe samples were collected by Autumnwood ESH Consultants, LLC. Residential and monitoring well samples have been and will be collected by Cabeno Environmental Field Services, LLC. All samples were analyzed by Test America Laboratories, Inc. in University Park, IL.

4.2 FIELD INVESTIGATION RESULTS

All of the analytical data from the 2012 RCRA Corrective Measures Implementation Field Investigation are provided in Table 4-1. Three samples each from GP-18 and GP-22, at the depths noted above, were collected on the first day of sampling, October 15, 2012. These six samples were picked up, along with a trip blank by Test America for one day analytical turn around to determine if Central Wire had located the leading edge of the chlorinated solvent plume. While TCA (at 7.9 ug/L) and TCE (at 2.1 ug/L) were detected in GP-22S indicating some plume movement, they were detected at 4% and 40% of the MCLs, respectively. There were **no detections of the chemical of concern above the MCL's** at any of the six samples analyzed from the two Geoprobe locations. An equipment decontamination (field) blank was also collected on the first day of sampling.

The detections observed in these two samples included estimated values of toluene ranging from 0.17 to 0.40 ug/L in five of the six samples. Toluene is not a chemical of concern at this site and will not be discussed in this report.

Acetone was found in GP-22D at 6 ug/L. There is no MCL for acetone. Acetone is also not a chemical used at the plant. Acetone is not a chemical of concern at this site and will not be discussed in this report.

At the historical sampling location GP-3, chemicals of concern were found including 1,1-Dichloroethene (DCE) and Trichloroethene (TCE) at all three levels of sample collection. All of the three values found for DCE and TCE were above the MCL (7 ug/L for DCE and 5 ug/L for TCE) except the shallow sample for GP-3S for DCE. In addition, total 1,2-DCE; 1,1-Dichloroethane (DCA), 1,1,1-Trichloroethane (TCA) and 1,1,2-TCA were found in at least one of the three samples at this location. The TCA at the 57 foot location exceeded the MCL, it was found at 210 ug/L.

In the other historical sampling location, GP-8, chemicals of concern found at the 27 foot sampling depth included 1,1-DCE, 1,1,1-TCA, and TCE. The MCL for TCE was exceeded, 11 ug/L was found at this location. The 85 foot sample detections were found for 1,1-DCA which was footnoted as an estimated value (J noted).

In the four other sampling locations that repeated the locations from the 2,009 and 2011 field investigation (GP-16, GP-17, GP-19 & GP-20), **no MCL's were exceeded**.

There were no detections of the chemicals of concern at any of the three samples at GP-16.

There were no detections of the chemicals of concern at any of the three samples at GP-17.

In the three GP-19 samples, the chemicals of concern detected were 1,1-DCE, total 1,2-DCE, 1,1,1-TCA and TCE...

In the GP-20 samples, vinyl chloride, chloroethane, 1,1-DCE; total 1,2-DCE and 1,1-DCA were detected. In the shallow sample the detections were less than the Reporting Limit but great than or equal to the Method Detection Limit so the concentrations are an approximate value. Only the detections for 1,1-DCE, total 1,2-DCE, and 1,1-DCA in the intermediate and deep samples were not estimated values and all were below the MCL's. This seems to indicate that the VOC are migrating to lower areas in the aquifer.

Data and plots over time of sampling locations where VOC's exceeded MCL's are provided in Figure 4-1. These locations are at GP-3S, GP-3I, GP-3D and GP-8S. At GP-3S concentrations of TCE and 1,1-DCE have fallen off since 2011. At GP-3I TCE and 1,1,1-TCA increased from 2011 to 2012 and at GP-3D TCE and 1,1 DCE have increased from 2009 to 2012. At GP-8S TCE was elevated (8.2 ug/L) in 2009, then went to non-detectable in 2011 and increased to 11 ug/L in 2012.

Two trip blank and four equipment decontamination (field) blanks were submitted for analysis, one field blank for each day of sampling as stated in the Work Plan. There were no detections in any of these samples (see Table 4-1).

5.0 CONCLUSION

Data from the wells and geoprobe locations are consistent with a plume emanating from the Central Wire site to the northwest. This plume is slowly attenuating in the area between Central Wire and the extraction wells. The plume appears to be stable at MW-HBR, EW-2, and the DGW1 cluster, and likely decreasing in strength at EW-1. The plume has migrated into the Geoprobe area and is increasing in strength at parts of the GP-3 and GP-8 clusters. It appears the plume has not migrated a substantial distance beyond the GP-8 location since 2009. The plume also has migrated to the north toward GP-19 and GP-20, but does not appear to have migrated north of the river in this area based on the sample collected at GP-21 in 2010 on the north side of the river.

Putting together the data Central Wire has obtained from its on and off site RCRA groundwater monitoring network, extraction wells, the residential and irrigation well data and the data from the geoprobe investigations, we have developed a series of figures depicting the chlorinated plume by total VOCs, TCE, PCE, 1,1-DCE and TCA.

The total VOC figure, Figure 5-1, shows the bulk of the remaining chlorinated solvents are located Non-responsive with the leading edge of the plume located at the geoprobe locations about 1,770 feet Non-responsive. There is also contamination remaining in the source area around the Central Wire plant, but the total VOC values of 200 ug/L are less than the northwest lobe at about 500 ug/L.

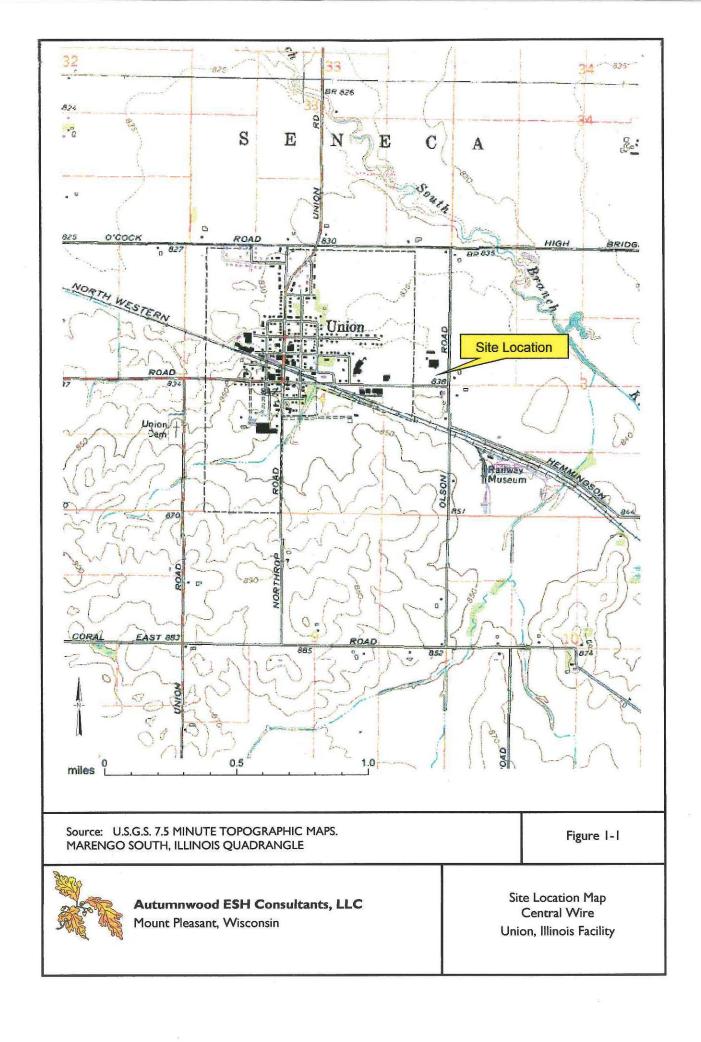
TCE is shown in Figure 5-2 and is focused in the northwest lobe of the chlorinated plume around GP-8 at 93 ug/L. PCE concentrations are shown in Figure 5-3 and centered more around the plant and out to the HBR monitoring well with lower levels found at extraction wells no.1 and 2. The 1,1-DCE plume which is a degradation product, is focused around GP-3 with levels of 50 ug/L in the intermediate depth well. The TCA plume is also focused in the Geoprobe /DGW-1 areas with the highest values at the GP-3 intermediate sample at 210 ug/L, slightly above the MCL and 150 ug/L at DGW-11.

EPA requested that Central Wire provide cross section views of the chlorinated plume. This can only be done where samples are collected at different depths. The only area in which that can be accomplished is between DGW-1 and the cluster of Geopprobe points. DGW-I is a three well nest. The current well depths are 27 feet, 57 feet and 82 feet. Samples collected at the geoprobe points were attempted to be and usually were accomplished at 27 feet, 57 feet and 85 feet. Figure 5-6 shows a plan view of the chlorinated plume from DGW-1 to the end of the plume. It also shows where cross section A-A' is, along the direction of the plume flow and where cross sections B-B' and C-C' are, perpendicular to plume flow.

Figure 5-7 shows the cross sectional view along the line of the chlorinated plume flow, Section A-A'. The values found at 80 plus feet at DGW-1 and GP-3 indicate the vertical extent of the plume probably is deeper than 85 feet since total volatile at that depth are at approximately 72 ug/L at DGW-1 and at 77 ug/L at GP-3. The figure shows that the leading edge tapers toward a shallower depth between GP-3 and GP-18 and 22.

In Figure 5-8 cross section B-B' shows the chlorinated plume at GP-16 – GP-17 – GP-3 – GP-19 – GP-20. Figure 5-1 shows that this are have the highest values of total VOCs at the 57 foot depth, including 1,1-DCE, 1,2-DCE, 1,1-DCA, 1,1,1-TCA, 1,1,2-TCA and TCE totaling over 390 ug/L./ Cross section C-C', further downgradient depicting data from GP-17 – GP-18 – GP-8 – GP-19, shows much less contamination, but TCE values GP-8 at 57 feet still exceed the MCL at 11 ug/L in 2012.

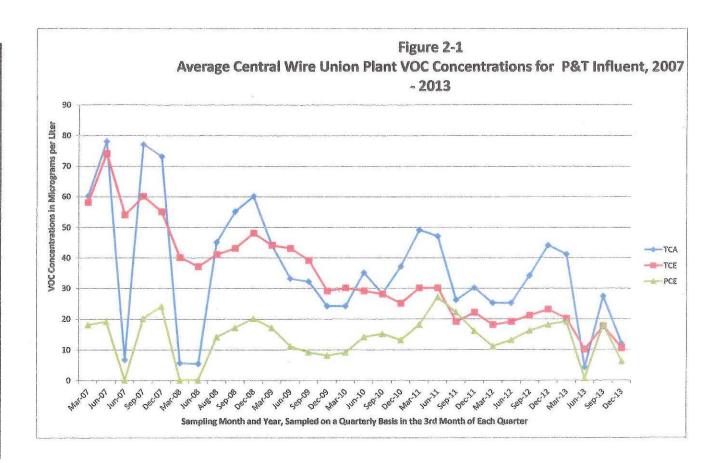
FIGURES



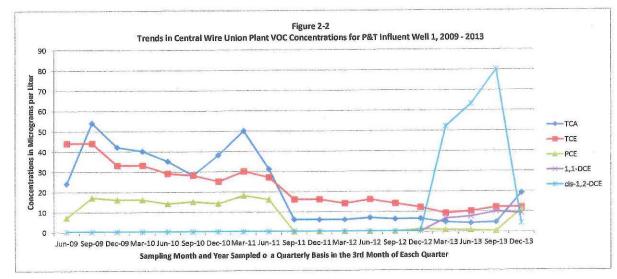
Average P&T Influent Concentrations, ug/L

	TCA	TCE	PCE
Mar-07	60	58	18
Jun-07	78	74	19
Jun-07	7	54	0
Sep-07	77	60	20
Dec-07	73	55	24
Mar-08	6	40	0
Jun-08	5 -	37	0
Aug-08	45	41	14
Sep-08	55	43	17
Dec-08	60	48	20
Mar-09	44	44	1.7
Jun-09	33	43	11
Sep-09	32	39	9
Dec-09	24	29	8
Mar-10	24	30	9
Jun-10	35	29	14
Sep-10	28	28	15
Dec-10	37	25	13
Mar-11	49	30	18
Jun-11	47	30	27
Sep-11	26	19	22
Dec-11	30	22	16
Mar-12	25	18	11
Jun-12	25	19	13
Sep-12	34	21	16
Dec-12	44	23	18
Mar-13	41	20	19
Jun-13	4	10	0.60
Sep-13	27.2	17.5	18
Dec-13	11.75	10.45	6.1
MCL	200	5	5

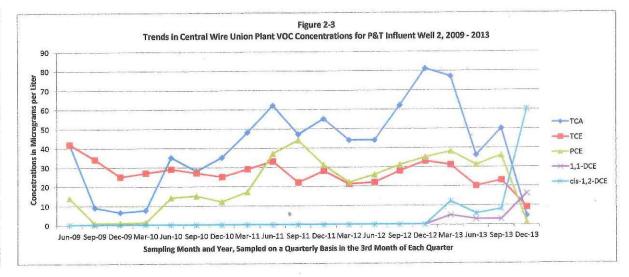
MCL = Maximum Contaminant Limit Values above the MCL are in bold



		I 1 VOC Co			
	TCA	TCE	PCE	1,1-DCE	cis-1,2-DCE
Jun-09	24	44	7.1	0	0
Sep-09	54	44	17	0	0
Dec-09	42	33	16	0	0
Mar-10	40	33	16	0	0
Jun-10	35	29	14	0	0
Sep-10	28	28	15	0	0
Dec-10	38	25	14	0	0
Mar-11	50	30	18	0	0
Jun-11	31	27	16	0	0
Sep-11	5.9	16	0	0	0
Dec-11	5.87	16	0	0	0
Mar-12	5.8	14	0	0	0
Jun-12	6.8	16	0	0	0
Sep-12	6.1	14	0	0	0
Dec-12	6.3	12	1.1	0	0
Mar-13	4.5	9	0.72	6.4	52
Jun-13	4	10	0.6	7.3	63
Sep-13	4.4	12	<0.17	9.8	80
Dec-13	19	12	11	9	4
MCL	200	5	5	7	70



	TCA	TCE	PCE	1,1-DCE	cis-1,2-DCE
Jun-09	42	42	14		-
Sep-09	9	34	0.78	<i>J</i> -	-
Dec-09	6.5	25	0.87	-	-
Mar-10	7.6	27	1.2	-	-
Jun-10	35	29	14	-	=
Sep-10	28	27	15	-	-
Dec-10	35	25	12	-	
Mar-11	48	29	17	-	-
Jun-11	62	33	37		
Sep-11	47	22	44		-
Dec-11	55	28	31	-	-
Mar-12	44	21	22		-
Jun-12	44	22	26		-
Sep-12	62	28	31	-	-
Dec-12	81	33	35	-	-
Mar-13	77	31	38	4.8	12
Jun-13	36	20	31	2.7	5.7
Sep-13	50	23	36	2.7	8
Dec-13	4.5	8.9	1.2	16	60
MCL	200	5	5	7	70



MCL = Maximum Contaminant Limit
Values above the MCL are in **bold**= not analyzed

Figure 4-1 Data and Plots of Geoprobe Wells with VOC Concentrations Exceeding MCLs from 2007 to 2012 **Central Wire Union Plant**

GP-33					
	2007	2008	2009	2011	2012
TCE	59	60	75	84	27
1,1-DCE	0	9.1	11	9.7	3.1

-	n	21
U	Р.	-51

	2007	2008	2009	2011	2012
TCE	42	60	27	65	93
1,1-DCE	17	48	69	57	51
1,1,1-TCA	73	210	110	160	210

GP-3D

01 30			and the second s		
alis Valv	2007	2008	2009	2011	2012
TCE	11	4.5	0	7	18
1,1-DCE	8.9	17	11	17	22

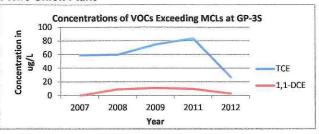
GP-8S

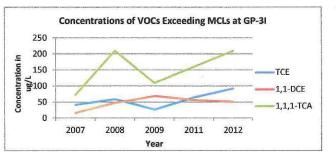
	2007	2008	2009	2011	2012
TCE	-	0	8.2	0	11

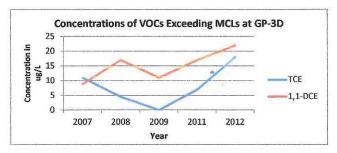
= exceeds MCL Bold

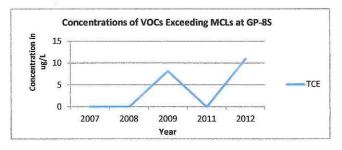
= element not sampled for during this round

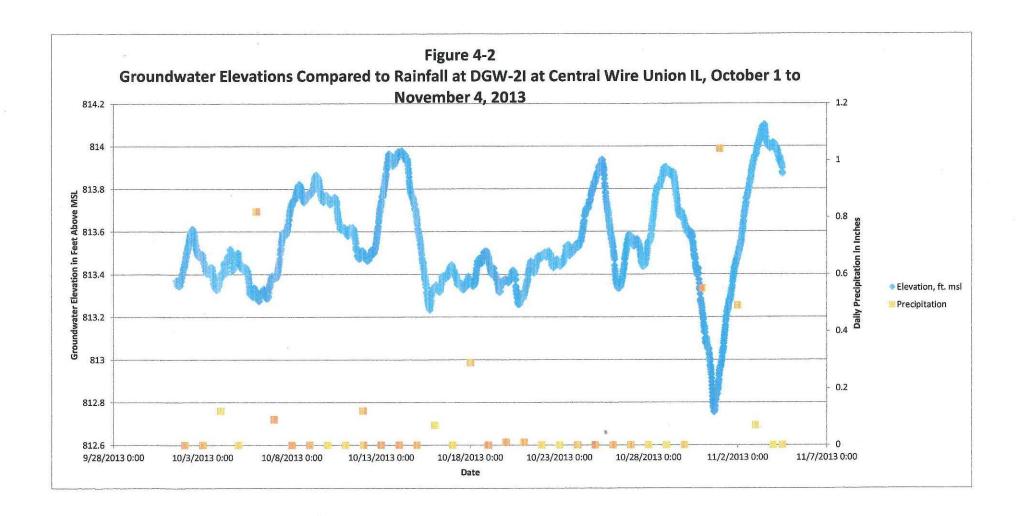
Values = Concentration in ug/L

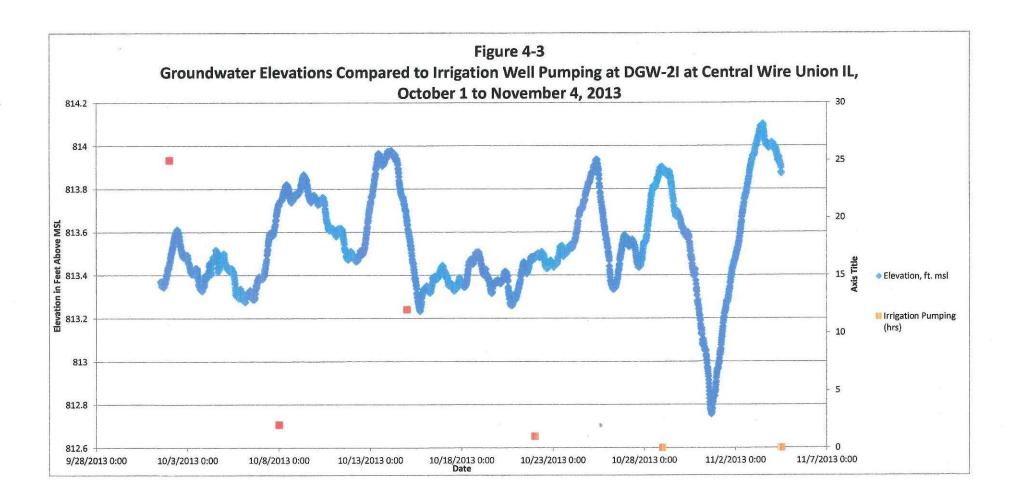


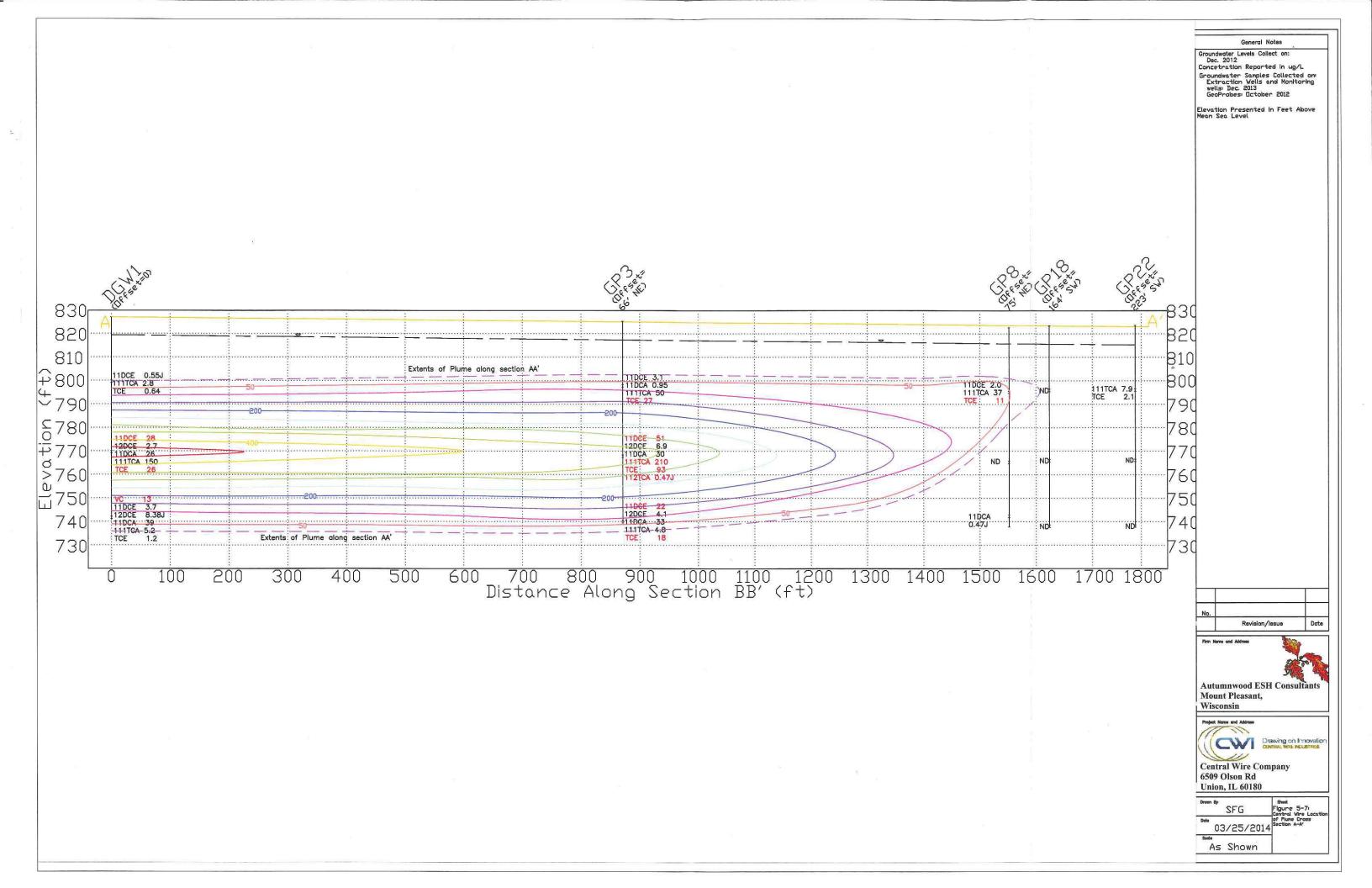


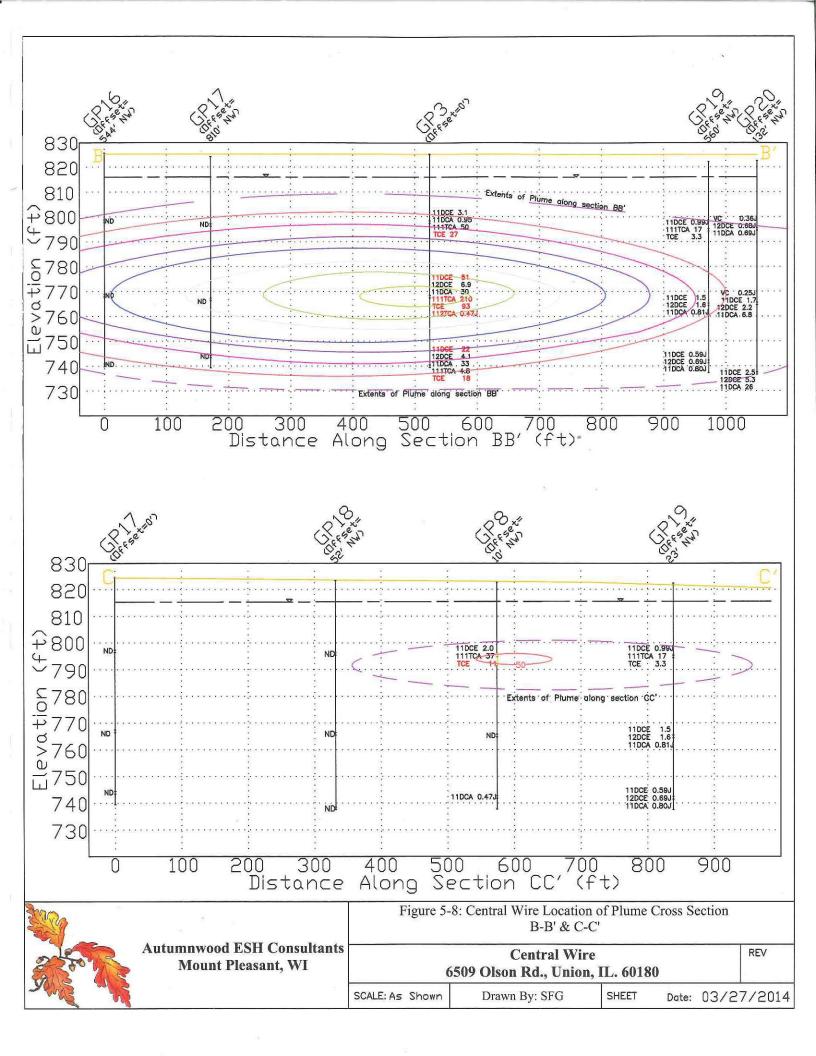












TABLES

Table 2-1
Average Gallonsper Day of Groundwater Treated in Central Wire Union Plant
Pump and Treat Facility - 2004 - 2014

	Month	Avg Daily Flow	Days	Gallons
2004	Contombos	879,000	Month 30	Treated 26,370,000
2004	September October	852,000	31	26,412,000
ı		836,000	30	25,080,000
ı	November December	825,000	31	25,575,000
7005		816,000	31	25,296,000
2005	January February	804,000	28	22,512,000
1	March	804,000	31	24,924,000
1		853,000	30	25,590,000
1	April May	865,000	31	26,815,000
	June	783,000	30	23,490,000
	July	793,000	31	24,583,000
	August	793,000	31	24,583,000
	September	786,000	30	23,580,000
	October	737,000	31	22,847,000
	November	852,000	30	25,560,000
	December	848,000	31	26,288,000
2006	January	827,000	31	25,637,000
	February	780,000	28	21,840,000
	March	826,000	31	25,606,000
	April	819,000	30	24,570,000
	May	811,000	31	25,141,000
	June	770,000	30	23,100,000
	July	754,000	31	23,374,000
]	August	453,000	31	14,043,000
	September	882,000	30	26,460,000
	October	871,000	31	27,001,000
	November	864,000	30	25,920,000
	December	848,000	31	26,288,000
2007	January	832000	31	25,792,000
	February	823000	28	23,044,000
	March	818,000	31	25,358,000
	April	864,000	30	25,920,000
	May	793,000	31	24,583,000
	June	836,000	30	25,080,000
	July	393,000	31	12,183,000
	August	743,000	31	23,033,000
	September	747,000	30	22,410,000
	October November	700,000	31 30	21,700,000 24,990,000
	December	833,000 908,000	31	28,148,000
2008			31	27,931,000
2000	January February	901,000 872,000	29	25,288,000
	March	864,000	31	26,784,000
	April	851,000	30	25,530,000
	May	835,000	31	25,885,000
	June	548,000	30	16,440,000
	July	990,000	31	30,690,000
	August	863,000	31	26,753,000
	September	890,000	30	26,700,000
	October	699,000	31	21,669,000
	November	977,000	30	29,310,000
	December	999,000	31	30,969,000
2009	January	999,000	31	30,969,000
	February	961,000	28	26,908,000
	March	991,000	31	30,721,000
	April	999,000	30	29,970,000
	May	990,000	31	30,690,000
	June	886,000	30	26,580,000
	July	892,000	31	27,652,000
	August	888,000	31	27,528,000
	September	884,000	30	26,520,000
	October	860,000	31	26,660,000
	November	880,000	30	26,400,000
	December	832,000	31	25,792,000

	Month	Avg Daily Flow	Days/	Gallons
2010	January	866,000	Month 31	Treated 26,846,000
2010	February	860,000	28	24,080,000
	March	861,000	31	26,691,000
	April	855,000	30	25,650,000
	May	837,000	31	25,947,000
	June	832,000	30	24,960,000
	July	706,000	31	21,886,000
	August	722,000	31	22,382,000
	September	833,000	30	24,990,000
	October	802,000	31	24,862,000
	November	788,000	30	23,640,000
	December	765,000	31	23,715,000
2011	January	576,000	31	17,856,000
	February	710,000	28	19,880,000
	March	733,000	31	22,723,000
	April	725,000	30	21,750,000
	May	712,000	31	22,072,000
	June	706,000	30	21,180,000
	July	698,000	31	21,638,000
	August	452,000	31	14,012,000
	September	584,000	30	17,520,000
	October	815,000	31	25,265,000
	November December	836,000 823,000	30	25,080,000 25,513,000
2012		 	31	24,986,000
2012	January February	806,000 804,000	29	23,316,000
	March	726,000	31	22,506,000
	April	788,000	30	23,640,000
	May	789,000	31	24,459,000
	June	774,000	30	23,220,000
	July	757,000	31	23,467,000
	August	747,000	31	23,157,000
	September	729,000	30	21,870,000
	October	631,000	31	19,561,000
	November	690,000	30	20,700,000
	December	570,000	31	17,670,000
2013	January	676,000	31	20,956,000
	February	674,000	28	18,872,000
	March	657,000	31	20,367,000
	April	674,000	30	20,220,000
	May	662,000	31	20,522,000
	June	653,000	30	19,590,000
	July	640,000	31	19,840,000
	August	463,000	31	14,353,000
	September	525,000	30	15,750,000
	October	635,000 622,000	31	19,685,000 18,660,000
	November December	606,000	31	18,786,000
2014	January	594,000	31	18,414,000
2017	February	586,000	28	16,408,000
	March	000,000	1 20	10,400,000
	April		 	
	May	' 	 	
	June		1	
	July			1
	August			l
	September			
	October			
	November			
	December			

Table 3-1
Historical VOC Data for Monitoring Well DGW-1S, Central Wire Plant, Union, Ilinois

Date		Str / St	5 ⁶ / 1,1	508 / 1,1,1	ich 'ú	5CP _ ((\$4 \ \$C
February-98	0	0	0	0	0	0.6	0
April-02	0	0	0	1.2	0	0	1.2
June-05	0	0	0	2.2	0	1	0
December-05	0	0	0	1.39	0	0	0
June-06	0	0	0	1.2	0	0	0
December-06	0	0	0	1.3	0	1	0
June-07	0	0	0	1.1	0	0	0
September-07	0	0	0	1.4	0	0 -	0
December-07	0	0	0	1.8	0	2.1	0
March-08	0	0	0	2.5	0	1	0
June-08	0	0	0	1.8	0	0	0
October-08	0	0	0	2.4	0	0	0
June-09	0	0	0	3.7	0	1.1	0
December-09	0	0	0	5.2	0	1.7	0
June-10	0	0	0	-	0	0	0
December-10	0	0	0	3.4	0	1.1	0
June-11	0	0	0	3.5	0	1	0
December-11	0.56 J	0	0	3.4	0	1	0.72 J
June-12	0.81 J	0	0	_	0	1.2	0.60 J
December-12	5.3	2.8	0	15	0	0.76	0
June-13	1,1	0	5.2	0	1.9	0	0
December-13	0.55	0	0	2.8	0	0.64	0
MCL	7	170	800**	200	5	5	5

Table 4-1 October 2012 RCRA CMI Field Investigation Geoprobe Samping Results

	•	Monito	ring Location	GP-3S	GP-3I	GP-3D	GP-8S	GP-81	GP-8D	GP-168	GP-161	GP-16D	GP-17S	GP-17I	GP-17D
		L.	aboratory ID:												
		Sa	mpling Date:	0-12	0-12	0-12	0-12	0-12	0-12	0-12	0-12	0-12	0-12	0-12	0-12
Parameter	Method	Units	MCL		<u> </u>	-				-	-			-	-
Vinyl Chloride	8260B	mg/L	2	·	-		_	-	-	-		-	-	-	-
Chloroethane	8260B	mg/L	***	2	-	1	-	-	-	-	-		-		-
1,1-Dichloroethene	8260B	mg/L	7	3.1	51	22	2.0	-		-	-	-			-
total 1,2-Dichloroethene	8260B	mg/L	170		6,9	4.1	-	-	-	-	-	-	•	-	-
1,1-Dichloroethane	8260B	mg/L	800**	0.95	30	33	-	-	0.47 J	-		•	-	m	-
1,1,1-Trichloroethane	8260B	mg/L	200	50	210	4.8	37	-		-	•	-		-	
1,2-Dichloroethane	8260B	mg/L	5		-	-	-	-	-	-	•	-		-	
Trichloroethene	8260B	mg/L	5	27	93	18	11	-		-		-	-		-
1,1,2-Trichloroethane	8260B	mg/L.	5	_	0.47 J	-	-		-			-		-	-
Tetrachloroethene	8260B	mg/L.	5				-	-	-			.	-	-	-

		Monito	oring Location	GP-185	GP-18I	GP-18D	GP-19S	GP-19I	GP-19D	GP-20S	GP-20I	GP-20D	GP-22S	GP-22i	GP-22D
		L	aboratory ID:											l	<u></u>
		Sa	ampling Date:	0-12	0-12	Q-12	0-12	0-12	0-12	0-12	0-12	0-12	0-12	O-12	O-12
Parameter	Method	Units	MCL												
Vinyl Chloride	8260B	mg/L	2	_	-	•	-	-	-	0.36 J	0.25 J	-	-	-	-
Chloroethane	8260B	mg/L	***		_		-	-		0.77 J	0.64 J	-	-	-	
1,1-Dichloroethene	8260B	mg/L	7		-		0.99 J	1.5	0.59 J	¥	1.7	2.5	-	-	1
total 1,2-Dichloroethene	8260B	mg/Ł	170	_		_	-	1,6	0.69 J	0.68 J	2,2	5,3	-	-	1
1,1-Dichloroethane	8260B	mg/L	800**			_	-	0.81 J	0.80 J	0,69 J	6.8	26	-	-	-
1,1,1-Trichloroethane	8260B	mg/L	200		2	<u>.</u>	17	_	-		<u>.</u>	<u>-</u>	7.9	-	-
1,2-Dichloroethane	8260B	mg/L	5			<u>.</u>	-	-	-	L	-		-	-	-
Trichloroethene	82608	mg/L	5		-	-	3.3	-	-		2	-	2.1	-	
1,1,2-Trichloroethane	8260B	mg/L	5		2.00		-	-	-		-		-	-	-
Tetrachloroethene	82608	mg/L	5		2	200		-	-		100	<u> </u>	-	-	•

Kev

- J = Parameter detected below quantitation detection limit
- Not Detected @ Reporting Limit of 2 ug/L
- S, I, & D = 27', 57' & 85' in depth Except GP-17D and GP 19D(which was at 80' due to silt at 85')
 - ** = Region 9 Preliminary Remediation Goal
 - *** = no MCL established
- BOLD = exceeds Maximum Contaminant Level (MCL)

			Monitoring Location	Trip - 10/15/12	Decon 22 - 10/15/12	Trip- 10/18/12	Decon 08 - 10/16/12	Decon 19 - 10/17/12	Decon 20 10/18/12
		ı	aboratory ID:						
		S	ampling Date:	0-12	0-12	O-12	0-12	0-12	0-12
Parameter	Method	Units	MCL						
Vinyl Chloride	8260B	mg/L	2	-			-	-	-
Chloroethane	8260B	mg/L	***	ī		4	-	-	-
1,1-Dichloroethene	8260B	mg/L	7				-	-	
total 1,2-Dichloroethene	8260B	mg/L	170	i i i		•	-	-	-
1,1-Dichloroethane	8260B	mg/L	800**	. 101 -	-		-	<u> </u>	-
1,1,1-Trichloroethane	8260B	mg/L	200	+0.0	-		-	-	-
1,2-Dichloroethane	8260B	mg/L	5	4			-	-	-
Trichloroethene	8260B	mg/L	5	.	-	•	-	- "	-
1,1,2-Trichloroethane	8260B	mg/L	5			- 10 A		-	-
Tetrachloroethene	8260B	ma/L	5	£165045046	(4 m)	an da wat na	_	-	-

ATTACHMENT 1 GENERALIZED COLUMN OF ROCK STRATIGRAPHIC UNITS IN MCHENRY COUNTY

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SYSTEM	SERIES	GROUP OR FORMATION	AQUIFE	ER	LOG	THICKNESS (FT)	DESCRIPTION					
OUATER. NARY	PLEISTOCENE		Sands and		7	0-470	Unconsolidated glacial deposits-pebbly clay (till), silt, sand and gravel Alluvial silts and sands along streams					
9 2	PLEI		Gravels		SIT	Fissure Fillings	Shale, sandy, brown to black					
	B						Dolomite, very pure to argillaceous, sity, cherty; reefs in upper part					
	NIAGARAN	Sugar Run	1	luifer		0 -90	Dolomite, slightly argillaceous and silty					
SILURIAN	N.	Joliet -	Silurian	Shallow dolomite aquifer			Dolomite, very pure to shaly and shale, dolomitic; white, light gray, green, pink, maroon					
SII.	11AN	Kankakee		low d	7,7		Dolomite, pure top 1'-2', thin green shale partings, base glauconitic					
ļ	ALEXANDRIAN	Elwood		Sha	<u> </u>	0-70	Dolomite, slightly argillaceous, abundant layered white chert					
	ALEX	Wilhelmi					Dolomite, gray, argillaceous and becomes dolomitic shale at base					
7	CINCIN- NATIAN	Maquoketa				0-210	Shale, red to maroon, oolites Shale, silty, dolomitic, greenish gray, weak (Upper unit) Dolomite and limestone, white, light gray, interbedded shale (Middle unit) Shale, dolomitic, brown, gray (Lower					
DOVICIAN	ORDOVICIAN	Galena	Galena- Platteville		///	290-335	unit) Dolomite, and/or limestone, cherty (Lower part)					
OR		Platteville	1 mrredine	Ja Ja	/// /////		Dolomite, shale partings, speckled Dolomite and/or limestone, cherty, sandy at base					
	СНА	Glenwood	Glenwood- St. Peter		adui	<u>.</u> ::.]		Sandstone, fine and coarse grained; little				
	_	St. Peter					St. Peter			Glenwood- St. Peter	Cambrian Ordovician aquifer	govician Gov
		Eminence	Eminence	rian.O		0-150	Dolomite, light colored, sandy, thin sandstones					
		Potosi	Potosi	Camb	//\^	U-150	Dolomite, fine-grained, gray to brown, drusy quartz					
	-	Franconia	Franconia			40-95	Dolomite, sandstone and shale, glau- conitic, green to red, micaceous					
Ā	N A	Ironton	tronton- Galesville		$ \mathcal{I}_{\mathcal{I}} $	100-190	Sandstone, fine to coarse grained, well sorted; upper part dolomitic					
CAMBRIAN	CROIXAN	Galesville	Colesattis	Щ	2.2.2		Jos Ico, apper pert dolonite					
CAM		Eau Claire			7 / G/ / 7 /	385-485	Shale and siltstone, dolomitic, glauconitic; sandstone, dolomitic, glauconitic					
		Elmburst Member		r. Uifer	: <u>خ</u> نز::::							
		Mt. Simon	Elmhurst- Mt, Simon	Etmhurst- Mt. Simon aquifer	ام ممسمون محموم م	1200-2000	Sandstone, coarse grained, white, red in lower half; lenses of shale and siltstone, red, micaceous					
PRE-		····	<u></u>		· · · · · · · · · · · · · · · · · · ·		Granitic rocks					

SOURCE: ILLINOIS STATE WATER SURVEY, BULLETIN 60-19, 1976.

FIGURE 2-1



Three Hawthorn Parkway Vernon Hills, Illinois 60061 GENERALIZED COLUMN OF ROCK STRATIGRAPHIC UNITS IN McHENRY COUNTY TECHALLOY COMPANY, INC. Union, Illinois

ATTACHMENT 2

DOCUMENTS AND DRAWINGS RELATED TO AQUIFER TESTING AND CAPTURE ZONE DESIGN OF THE CENTRAL WIRE CHLORINATED PLUME

ATTACHMENT 2

DOCUMENTS AND DRAWINGS RELATED TO AQUIFER TESTING AND CAPTURE ZONE DESIGN OF THE CENTRAL WIRE CHLORINATED PLUME

This attachment presents the results of an aquifer pumping test in the area where Extraction Well No. 1 is located. It is document in the attached letter from Carlos Serna of Roy F. Weston, Inc. (now Weston Solutions) on May 8, 1997. It concludes that the plume can be captured by a single 350 or 380 gpm pump. The original drawing showing the area of capture is also included here Central Wire first installed a single pump.

When deciding where to optimally place the pump along the plume, Central Wire had to consider access and a location where the entire plume could be captured, Hence the location of Extraction Well No. 1

EPA personnel became concerned that the chlorinated plume was not entirely captured on the west side and a second well fitted with a 350 gpm pump. Central Wire has added the same capture zone to the figure and it shows capture of water across 2,900 feet.



Roy F. Weston, Inc. Suite 400 3 Hawthorn Parkway Vernon Hills, Illinois 60061-1450 847-918-4000 • Fax 847-918-4055

8 May 1997

Mr. William Buller
U.S. EPA, Region V
RCRA Enforcement Branch (HRE-8J)
77 West Jackson Boulevard
Chicago, Illinois 60604

Work Order No. 01989-028-001

Re: Results of Aquifer Performance Evaluation

Following Pumping Test for Techalloy Company in Union, Illinois

Dear Mr. Buller:

Roy F. Weston, Inc. (WESTON®) is providing U.S. EPA with an aquifer performance evaluation that was conducted on March 20, 21, and 22, 1997. The purpose of this pumping test was to determine the hydraulic characteristics of the saturated zone at an extraction well (EW-1) downgradient to the Techalloy Company in Union, Illinois.

An 8-inch diameter extraction well was installed by WESTON in September 1996 (part of "Interim Measures" implementation) approximately 750 feet north of the intersection of the Non-responsive. Two piezometers (PZ-01 & PZ-02) located 50 and 100 feet north of the extraction well respectively, were also monitored to assess the impact of the pumping test on the aquifer. One monitoring well (MW-HBR) located approximately 750 feet upgradient to EW-1 was also monitored to assess the impact of the pump test. Figure 1 presents the location of the extraction well, the two piezometers, and the monitoring well MW-HBR.

The aquifer performance evaluation was conducted in accordance with the U.S. EPA's letter dated July 1, 1993 following approval of "The Interim Measures Workplan". Characterization of aquifer hydraulic characteristics was necessary to evaluate the optimum pumping rate and adjust it to a rate that can maximize the effectiveness of the Interim Measures. Based on the absence of any clay layers within the aquifer, which could have potentially acted as a confining or semi-confining layer, the aquifer was classified as an unconfined water table aquifer.

A 48-hour pumping test duration was selected to allow observation of early time data (when the most significant changes in drawdown occur) and late time data as the aquifer approached steady-state conditions. As part of the implementation of the Interim Measures, the extraction well (EW-1) has been pumping water at a rate of approximately 380 gallons per minute (gpm) to a treatment building since December 1996 for treatment and discharge





into South Branch of Kishwaukee River. Static water level for the extraction well, the two piezometers, and the monitoring well MW-HBR were measured prior to the start of the pump test. These water levels reflect static water levels two weeks after the pumping of water from the extraction well was turned off.

AQUIFER TEST DATA ANALYSIS:

Distance-Drawdown and Time-Drawdown Analysis:

Water levels were recorded in the extraction well (EW-1) and MW-HBR during the pumping test using a Hermit 2000 Data Logger/pressure transducer system. Manual water level measurements were taken in PZ-01 and PZ-02 at intervals throughout the pumping test. The drawdown data from the 48-hour and 38-day constant discharge test were evaluated to determine the hydraulic parameters of transmissivity (T), specific yield (S), and hydraulic conductivity (K).

Aquifer test data analysis was initiated using the distance-drawdown analysis by modified non-equilibrium Jacob (straight line) method. For each of the two piezometers (PZ-01 and PZ-02) and the monitoring well (MW-HBR), distance-drawdowns were plotted on a semi-log graph for 2-days and 38-days. The graphs indicate that the maximum drawdowns were recorded in PZ-01 (closest @ 50 feet from extraction well). Aquifer test data analysis was also initiated for the piezometers PZ-01 and PZ-02 using time-drawdown data curve and matching resultant curves with model curves developed by Theis. The distance-drawdown for the 2-day and 38-days and the time-drawdown plots for the two piezometers (PZ-01 and PZ02) are attached. Response to extraction well pumping was observed to be essentially instantaneous in the observation wells located within 100 feet. No significant response was observed in MW-HBR (located 750 feet upgradient) during the 48-hour pumping test but a delayed response was observed during water level measurement taken 38-days of pumping. Maximum drawdown noted in the three wells were as follows:

Well ID	Distance from EW feet	Max. Drawdown (feet) 48 hours	Max. Drawdown (feet) 38 days
PZ-01	50	1.21	1.90
PZ-02	100	0.89	1.60
MW-HBR	750	0.15	0.86





Based on the fine grained material of the aquifer, it is inferred that drainage is relatively slow. Since the duration of the pumping test was only 48-hours, it is not long enough to account for the unusual S-shaped plots of log t versus log s. Hence the unusually high transmissivity values obtained for the piezometers PZ-01 and PZ-02 were not used in this analysis. For the purpose of our data analysis, an average of the transmissivity values obtained by the 2-days and 38-days distance-drawdown methods were only used.

Transmissivity:

Transmissivity (T) is a measure of the amount of water that can be transmitted horizontally by the saturated thickness of the aquifer, and as such, is defined as the product of the hydraulic conductivity and the aquifer thickness. During the installation of the extraction well, clay/till formation was encountered at an approximate depth of 78.7 feet below ground surface (bgs). Given a water table at approximately 10.9 feet bgs, the minimum saturated thickness across the study area is 67.8 feet and is used in subsequent calculations. The calculated results for the transmissivity values are presented below:

Distance-Drawdown	Calculated Transmissivity (T)					
Method	ft²/day	gpd/ft				
2-day (48 hours)	24,376	182,332				
38-day (912 hours)	26,814	200,568				
Arithmetic Mean	25,595	191,450				
Time-Drawdown Method	ft²/day	gpd/ft				
PZ-01	30,600	228,888				
PZ-02	44,800	335,104				

Storativity:

The storativity (S) represents the volume of water that a permeable unit will absorb or release from storage per unit surface area per unit change in head. In unconfined aquifers, the level of saturation rises and falls with changes in the amount of water in storage. As the water level falls (such as during a pump test), water drains from the pore spaces.





Distance-Drawdown	Calculated Storativity (S)					
Time-Drawdown Methods	S (no units)	Percent				
2-day (48 hours)	0.17	17				
38-day (912 hours)	0.05	5				

Hydraulic Conductivity:

Hydraulic Conductivity (K) values represent the rate at which water can move through a permeable medium. These values were calculated using the following expression:

$$K = \frac{T}{b}$$

Where:

T is the aquifer transmissivity

b is the saturated thickness of the aquifer

Distance-Drawdown	Calculated Hyd	Iraulic Conductivity (K)
Method	ft/day	cm/sec
2-day (48 hours)	359	1.2 E-1
38-day (912 hours)	395	1.4 E-1
Arithmetic Mean	377	1.3 E-1
Time-Drawdown Method	ft/day	cm/sec
PZ-01	451	1.6 E-1
PZ-02	660	2.3 E-1

CAPTURE ZONE ANALYSIS:

A groundwater capture zone analysis was carried out for Techalloy site in order to assess the impact on aquifer at two different pumping rates based on the seasonal fluctuation in well head. Time-related capture zones for a pumping well in a homogenous aquifer was



-5-

8 May 1997

determined by using U.S. EPA's Well Head Protection Area (WHPA) conceptual module: MWCAP.

Based on the aquifer pumping test data evaluation, a mean transmissivity of 25,595 ft²/day was calculated for an aquifer with a saturated thickness of 67.8 feet. Using a hydraulic gradient of 0.001 and porosity of 30%, the extraction well EW-1 shows the associated capture zones at 350 and 380 gpm in Figure 2 and 3, respectively.

Both the figures show that the plume can be contained effectively using the present extraction well system extracting at a rate of 350 or 380 gpm. Both these runs indicate pathlines for a period of 548 days (1.5 years).

If you have any questions or require additional information, please do not hesitate to contact me at (847) 918-4000

Very truly yours,

ROY F. WESTON, INC.

Carlos V. Serna, P.G. Senior Project Manager

CJS:sk

cc: Kevin Lesko, IEPA
Henry Lopes, Techalloy
David Williams, Techalloy
Scott Carr, Techalloy

Units of Drawdown

feet

Pumping Rate (Q)

380 gal/min or 73,155 ft³/day

Saturated aquifer thickness (b)

67.8-feet

Change in head over 1 log cycle (s)

1.1-feet

Distance from Extraction Well

To piezometer PZ-01

50-feet

To piezometer PZ-02

100-feet

To monitoring well MW-HBR

750-feet

Transmissivity (T)

T= <u>2.303 (Q)</u>

24,376 ft²/day

211 s

Hydraulic Conductivity (K)

K= 17/b

ft/day

Hydraulic Conductivity K=

348 ft/day or 1.2x10⁻¹ cm/sec

Storativity (S)

 $r_0 = 800$ feet

t= 2 days

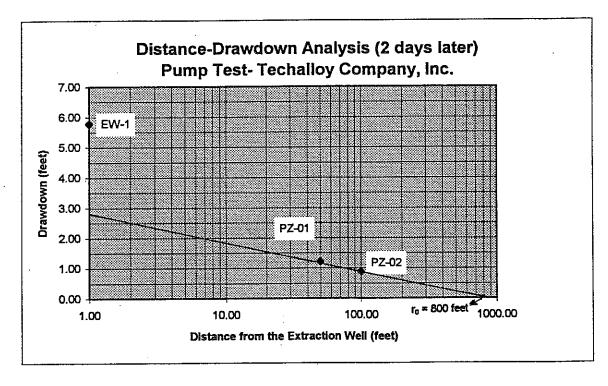
S= <u>2.25 (T) (t)</u>

 $S = 2.25 \times 24.376 \times 2$

 $(800)^2$

Storativity (S) =

0.17 or 17%



SUMMARY SHEET

Jacob (Straight line) method for Distance-Drawdown Analysis

Units of Drawdown

feet

Pumping Rate (Q)

380 gal/min or 73,155 ft³/day

Saturated aquifer thickness (b)

67.8-feet

Change in head over 1 log cycle (s)

1.0-foot

Distance from Extraction Well

To piezometer PZ-01 50-feet
To piezometer PZ-02 100-feet
To monitoring well MW-HBR 750-feet

Transmissivity (T)

T= <u>2.303 (Q</u>)

26,814 ft²/day

21 s

Hydraulic Conductivity (K)

(= T/b

ft/day

Hydrautic Conductivity K=

383 ft/day or 1.3x10⁻¹ cm/sec

Storativity (S)

 r_{σ} = 6,800 feet

t= 38 days

S= <u>2.25 (T) (t)</u>

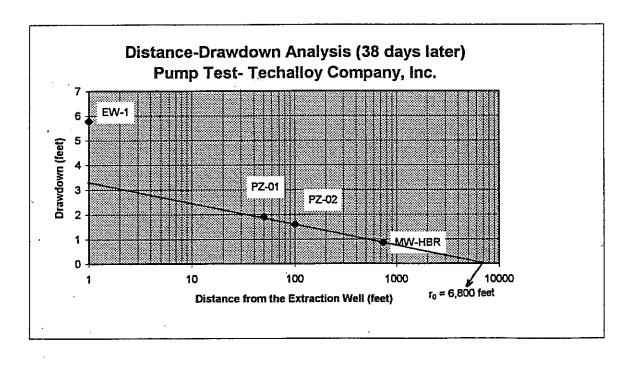
 $\frac{2.25 \times 26.814 \times 38}{(6,800)^2}$

r_o²

0,000,

Storativity (S)

0.05 or 5%

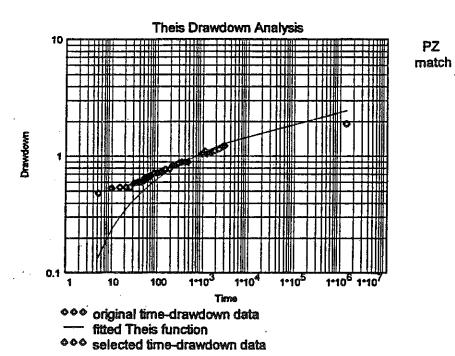


Name of data file	PZ-01
Number of data points in file	n = 38
Units of drawdown	L1 = 1 ·ft
Units of time	T1 = 1 •min
Pumping rate	Q = 380 • gal min
Radial distance from pumping well to observation well	r = 50 •ft
Saturated aquifer thickness	b = 67.8 •ft
Transmissivity estimate	$T = 3.06 \cdot 10^4 \cdot \frac{ft^2}{day}$
Storage coefficient estimate	S = 6.81·10 ⁻²
Specific storage coefficient	S _s = 3.29·10 ⁻³ ·m ⁻¹
Radial hydraulic conductivity	$K_r = 4.52 \cdot 10^2 \cdot \frac{ft}{day}$
Estimate of time match-point	t s = 2
Estimate of drawdown match-point	s _D = 0.19
Squared sum of errors	SS _e = 2.32·10 ⁻²

380 gpm

point

PΖ



PZ-02 Name of data file n = 38Number of data points in file L1 = 1 ·ft Units of drawdown T1 = 1 · min Units of time $Q = 380 \cdot \frac{gal}{}$ Pumping rate Radial distance from pumping well r = 100 ·ft to observation well b = 67.8 ·ft Saturated aquifer thickness $T = 4.48 \cdot 10^4 \cdot \frac{ft^2}{day}$ Transmissivity estimate $S = 2.49 \cdot 10^{-2}$ Storage coefficient estimate $S_s = 1.2 \cdot 10^{-3} \cdot m^{-1}$ Specific storage coefficient $K_{f} = 6.60 \cdot 10^{2} \cdot \frac{ft}{day}$ Radial hydraulic conductivity $t_S = 2$ Estimate of time match-point

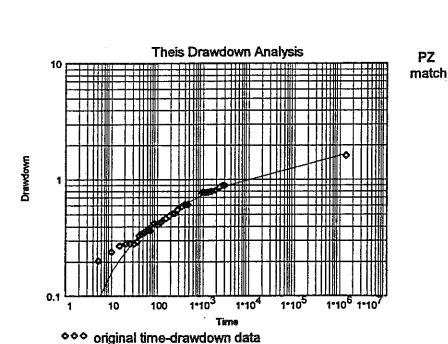
 $s_D = 0.13$

PΖ

SS _e = 1.21·10⁻³

380 gpm

point



Estimate of drawdown match-point

Squared sum of errors

fitted Theis function ♦♦♦ selected time-drawdown data

ATTACHMENT 3

SUMMARY OF MONITORING WELL CONSTRUCTION INFORMATION AND GROUNDWATER ELEVATIONS

ATTACHMENT 3 Summary of Monitoring Well Data and Groundwater Elevations Central Wire Union IL Plant

Well I.D.	Casing Elevation in Feet Above MSL	Water Level below Top of Casing	Groundwater Elevation in Feet Above MSL
DGW-2S	820.92	6.62	814.3
DGW-2I	821.27	6.87	814.4
DGW-2D	820.895	5.78	815.115

Significant Construction Information of DGW-2

Well I.D.	Date Installed	Depth in Feet Below Ground Surface	Screened Interval in Feet Below Ground Surface	Construction Material
DGW-2S	1/13/2010	27	17 - 27	Schedule 40 PVC
DGW-2I	1/15/2010	57	47 - 57 *	Schedule 40 PVC
DGW-2D	1/14/2010	83	73 - 83	Schedule 40 PVC

Table 2-1

Summary of Monitoring Well Data and Groundwater Elevations
Techalloy Company, Inc.
Union, Illinois

Well I.D.	Casing Elevation	Ground Elevation	Water Level	Groundwater Elevation
MW-1	836.44	833.94	10.72	825.72
MW-2	835.42	833.06	10.53	824.89
MW-3D	837.29	834.75	11.62	825.67
MW-4	836.50	834.85	11.22	825.28
MW-5	834.58	833.12	10.31	824.27
MW-5D	834.46	833.01	10.20	824.26*
MW-6	834.28	832.82	9.62	824.66
MW-7	834.60	832.92	10.57	824.03
MW-8	834.06	832.52	9.91	824.15
MW-9	834.58	832.98	10.18	824.40
MW-10	837.73	835.50	11.64	826.09
MW-11	833.03	831.30	11.02	822.01
MW-HBR	833.03	831.30	12.16	820.87
OBS-W	838.91	837.0	11.59	827.32
PTW-1	838.91	837.0	11.12	827.79

Note: All values are in feet.

Table 2-2

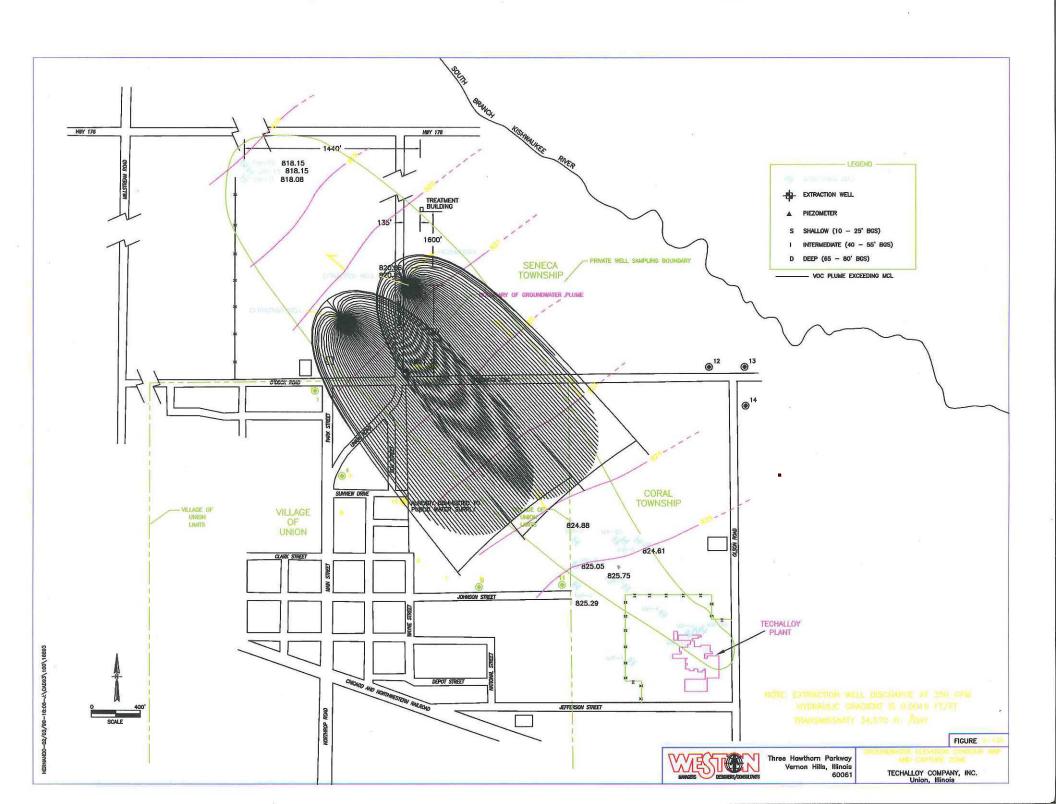
Significant Construction Information of Monitoring Wells at Techalloy RFI Study RFI Study Techalloy Company, Inc. Union, Illinois

Well I.D.	Date Installed	Depth (bgs) ft	Screened Interval	Construction Material
MW-1	January 1990	14.0	4-14	2"-PVC
MW-2	January 1990	15.0	5-15 ·	2"-PVC
MW-3D	January 1990	115.5	104-114	2"-PVC
MW-4*	January 1990	14.0		2"-PVC
MW-5	March 1990	38.5	27-37	2"-PVC
MW-5D	March 1990	90.0	74-84	2"-S.St
MW-6	March 1990	20.0	10-20	2"-PVC
MW-7	March 1990	26.0	16-26	2"-PVC
MW-8	March 1990	26.0	16-26	2"-PVC
MW-9	March 1990	28.0	16-26	2"-PVC
MW-10	July 1992	16.0	- 6-16 -1	2"-PVC
MW-11	July 1992	16.0	6-16	2"-PVC
MW-HBR	August 1990	35.0	17-27	2"-PVC
OBS-W	February 1992	41.0	18-38	2"-PVC
PTW-1	February 1992	39.0	29-39	6"-PVC

bgs = below ground surface ft = feet

PVC = Poly-Vinyl Chloride

S.St. = Stainless steel



ATTACHMENT 4

PLOTS (DATA & GRAPHS) OF VOC CONCENTRATIONS IN RCRA MONITORING WELLS WHERE MAXIMUM CONTAMINANT LEVELS WERE EXCEEDED CENTRAL WIRE UNION, IL

ATTACHMENT 4 CONTENTS

TRENDS IN VOC CONCENTRATIONS IN THE RCRA MONITORING WELLS WHERE THE MAXIMUM CONTAMINANT LEVELS WERE EXCEEDED

CENTRAL WIRE UNION, IL

FIGURE 1	MONITORING WELL MW-2, 1995 – 2013
FIGURE 2	MONITORING WELL MW-4, 1995 – 2013
FIGURE 3	MONITORING WELL MW-5, 1995 – 2013
FIGURE 4	MONITORING WELL MW-5D, 1995 – 2013
FIGURE 5	MONITORING WELL MW-6, 1995 - 2013
FIGURE 6	MONITORING WELL MW-7, 1995 - 2013
FIGURE 7	MONITORING WELL MW-8, 1995 – 2013
FIGURE 8	MONITORING WELL MW-9, 1995 – 2013
FIGURE 9	MONITORING WELL MW-HBR (HIGHBRIDGE RD.), 1995 – 2013
FIGURE 10	MONITORING WELL DGW-11, 1998 - 2013
FIGURE 11	MONITORING WELL DGW-1D, 1998 – 2013

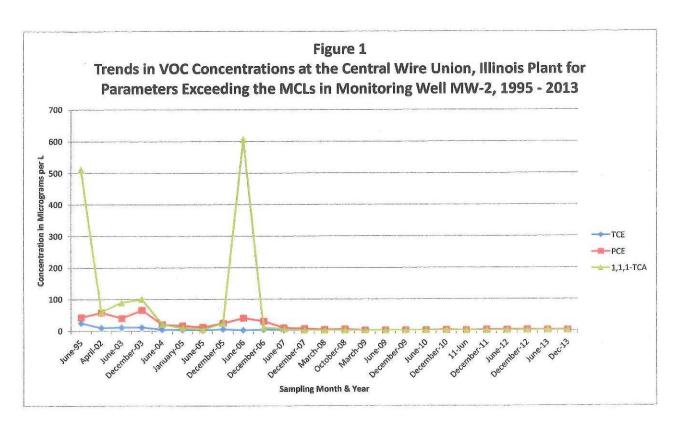
MW-2

Date	TCE	PCE	1,1,1-TCA
June-95	23	42	510
April-02	8.2	57	59
June-03	9.5	39	88
December-03	9.9	65	99
June-04	2.5	19	20
January-05	1.4	15	7.7
June-05	0	10	3.3
December-05	3.05	22.3	21.8
June-06	0	39	605
December-06	1.8	29	8.8
June-07	0	7.9	3.9
December-07	1.5	5.3	0
March-08	0	2.1	0
October-08	0	3.4	0
March-09	0	0	0
June-09	0	0	0
December-09	0	0	0
June-10	0	0	0
December-10	0	1.3	0
11-Jun	0	0	0
December-11	0	1.7	0
June-12	0	1.3	0
December-12	0.5	2	0
June-13	0	1.1	0
Dec-13	0	0.9	0

Concentrations reported in micrograms per liter.

Bold values exceed the MCL.

EPA Method 8240 was run. Only chemicals with detections above the MCLs were plotted.

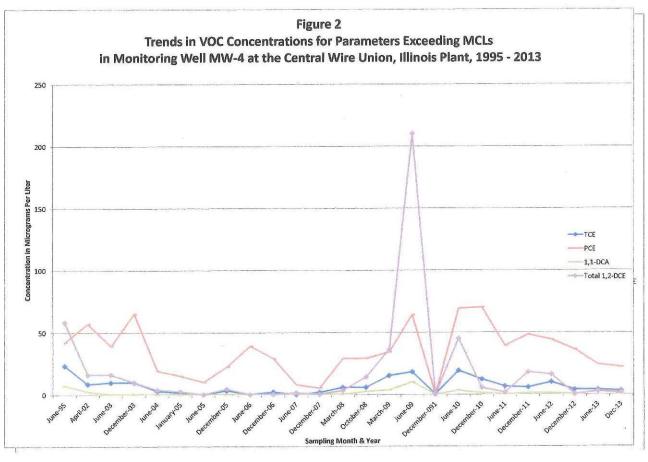


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Time	TCE	PCE	1,1-DCA	Total 1,2 DCE
June-95	23	42	7	58
April-02	8.2	57	2.3	16
June-03	9.5	39	0	16
December-03	9.5	65	0	9.8
June-04	2.5	19	0	3.5
January-05	1.4	15	0	2.3
June-05	0	10	0	0
December-05	3.05	22.3	0	4.31
June-06	0	39	0	0
December-06	1.8	29	0	0
June-07	0	7.9	0	1.3
December-07	1.5	5.3	0	0
March-08	5.5	29	0	3
October-08	5.5	29	2.2	14
March-09	- 15	34	3.4	36
June-09	18	64	9.9	210
December-091	0	0	0	0
June-10	19	69	3	45
December-10	12	70	0.99	5.3
June-11	6,3	39	0	1.5
December-11	5.5	48	1	18
June-12	9.7	44	0.94	16
December-12	3.5	36	0	0
June-13	3.6	24	2.3	2.4
Dec-13	2.8	22	0.6	1.6
MCL	5	5	7	170

Well not found under snow

Concentrations reported in micrograms per liter. 80id values exceed the MCL. EPA Method 8260B was run. Only chemicals with detections above the MCLs were plotted. June-95 data was not plotted due to large value.

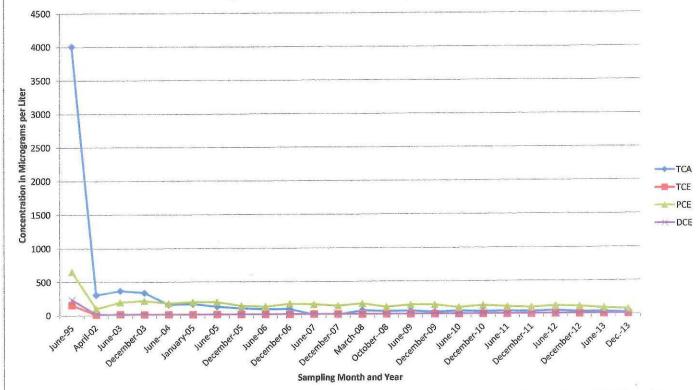


MW-5

IVIVV-5						
Sampling Month & Year	TCA	TCE	PCE	DCE		
June-95	4000	150	650	230		
April-02	300	5	94	12		
June-03	360	10	190	5		
December-03	330	7.5	210	1.8		
June04	150	4.7	170	0		
January-05	160	5.1	190	0		
June-05	120	4.9	190	0		
December-05	93.2	4.63	133	1.64		
June-06	78	4.7	120	0		
December-06	82	4	160	0		
June-07	0	4.5	150	5.7		
December-07	0	4.6	130	1.1		
March-08	58	3.8	160	0		
October08	45	3.1	110	0		
June-09	51	3.5	140	1.8		
December-09	31	2.7	140	0		
June-10	46	3.6	100	0.98		
December-10	37	3.2	130	1.5		
June-11	42	2.6	110	0.77		
December-11	36	2.5	98	0		
June-12	49	4.2	120	0.77		
December-12	29	2.6	110	0.94		
June-13	29	2.4	86	0		
Dec13	19	1.8	72	0		
MCL	200	5	5	7		

Concentrations reported in micrograms per liter. Bold values exceed the MCL.

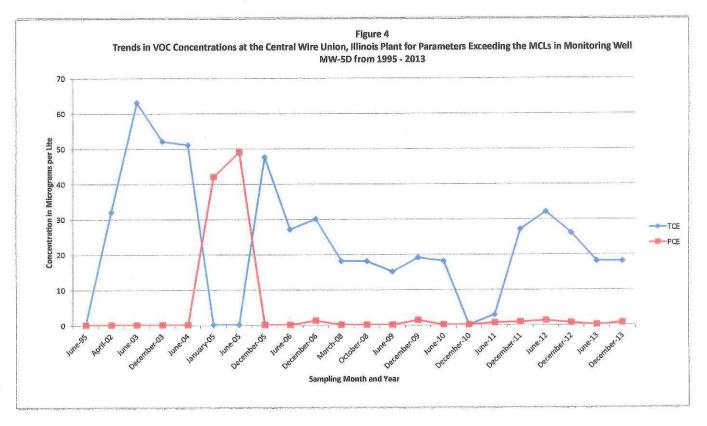




MW-5D

Time	TCE	PCE
June-95	0	0
April-02	32	0
June-03	63	0
December-03	52	0
June-04	51	0
January-05	0	42
June-05	0	49
December-05	47.5	0
June-06	27	0
December-06	30	1.2
March-08	18	0
October-08	18	0
June-09	15	0
December-09	19	1.3
June-10	18	0
December-10	0	0
June-11	2.8	0.57
December-11	27	0.79
June-12	32	1.2
December-12	26	0.56
June-13	18	0
December-13	18	0.6
MCL	5	5

Concentrations reported in micrograms per liter. Bold values exceed the MCL.

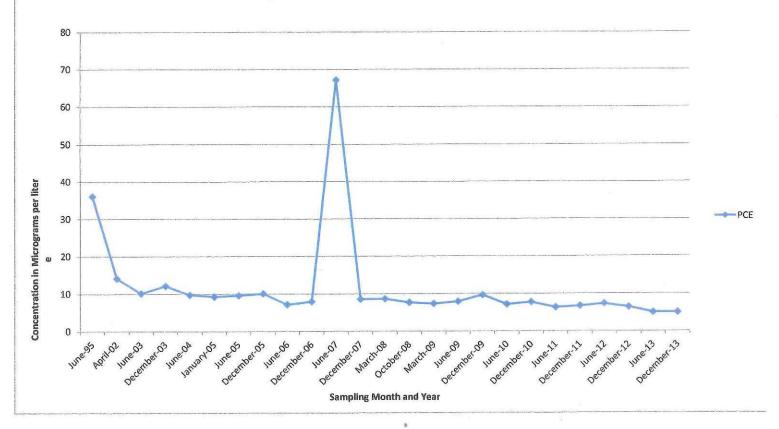


MW-6			
Time	PCE		
June-95	36		
April-02	14		
June-03	10		
December-03	12		
June-04	9.6		
January-05	9.1		
June-05	9.4		
December-05	9.91		
June-06	7		
December-06	7.8		
June-07	67		
December-07	8.4		
March-08	8.5		
October-08	7.54		
March-09	7.2		
June-09	7.8		
December-09	9.5		
June-10	7		
December-10	7.6		
June-11	6.2		
December-11	6.6		
June-12	7.2		
December-12	6.3		
June-13	4.9		
December-13	4.9		
MCL	5		

Concentrations reported in micrograms per liter. Bold values exceed the MCL. EPA Method 8260B was run. Only chemicals with

detections above the MCLs were plotted.

Figure 5
Trends in VOC Concentrations at Central Wire Union, Illinois Plant for Parameters Exceeding the MCLs in Monitoring Well MW-6 from 1995 - 2013

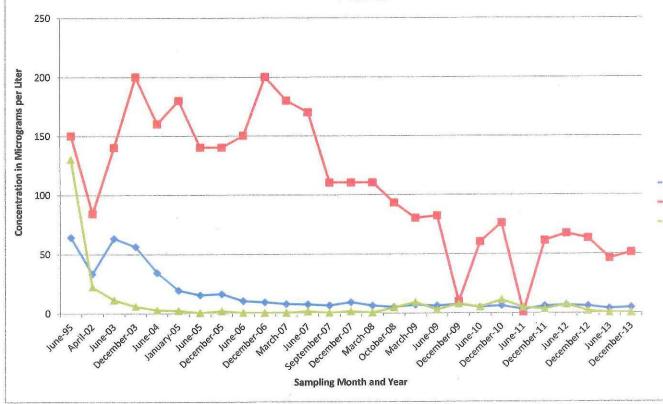


MW-7

	10100-7					
Time	TCE	PCE	1,1-DCE			
June-95	64	150	130			
April-02	33	84	22			
June-03	63	140	11			
December-03	56	200	5.5			
June-04	34	160	2.3			
January-05	19	180	1.9			
June-05	15	140	0			
December-05	16	140	1.45			
June-06	10	150	0			
December-06	9	200	0			
March-07	7.5	180	0			
June-07	7.2	170	1.1			
September-07	6.2	110	0			
December-07	8.9	110	1.2			
March-08	6	110	0			
October-08	4.8	93	4.3			
March-09	6.5	80	8.8			
June-09	5.9	82	2.4			
December-09	7.2	9.4	7.5			
June-10	4.8	60	4.8			
December-10	5.9	76	11			
June-11	2.8	0.57	4.6			
December-11	5.7	61	3			
June-12	6.5	67	7			
December-12	5.6	63	1.4			
June-13	3.5	46	0			
December-13	4.5	51	0			
MCL	5	5	7			

Concentrations reported in micrograms per liter. Bold values exceed the MCL.

Figure 6
Trends in VOC Concentrations at the Central Wire Union, Illinois Plant for Parameters Exceeding the MCLs in Monitoring Well MW-7 from 1995 - 2013

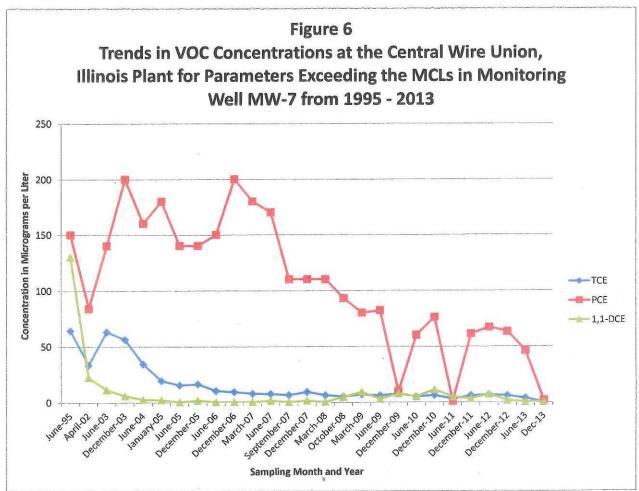


MW-7

and the second second	IVI VV - /		
Time	TCE	PCE	1,1-DCE
June-95	64	150	130
April-02	33	84	22
June-03	63	140	11
December-03	56	200	5.5
June-04	34	160	2.3
January-05	19	180	1.9
June-05	15	140	0
December-05	16	140	1.45
June-06	10	150	0
December-06	9	200	0
March-07	7.5	180	0
June-07	7.2	170	1.1
September-07	6.2	110	0
December-07	8.9	110	1.2
March-08	6	110	0
October-08	4.8	93	4.3
March-09	6.5	80	8.8
June-09	5.9	82	2.4
December-09	7.2	9.4	7.5
June-10	4.8	60	4.8
December-10	5.9	76	11
June-11	2.8	0.57	4.6
December-11	5.7	61	3
June-12	6.5	67	7
December-12	5.6	63	1.4
June-13	3.5	46	0
Dec-13	0	1.8	0

MCL:	5	5	7
S		de La Company	

Concentrations reported in micrograms per liter. Bold values exceed the MCL.

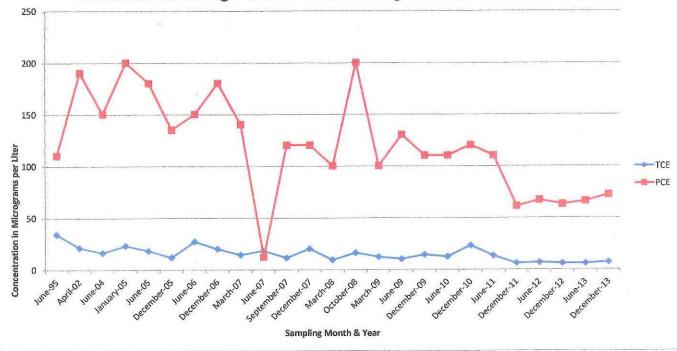


MW-8

Time	TCE	PCE
June-95	34	110
April-02	21	190
June-04	16	150
January-05	23	200
June-05	18	180
December-05	11.6	135
June-06	. 27	150
December-06	20	180
March-07	14	140
June-07	18	12
September-07	11	120
December-07	20	120
March-08	9.1	100
October-08	16	200
March-09	12	100
June-09	9.9	130
December-09	14	110
June-10	12	110
December-10	23	120
June-11	13	110
December-11	5.7	61
June-12	6.5	67
December-12	5.6	63
June-13	5.5	66
December-13	6.9	72
MCL	5	5

Concentrations reported in micrograms per liter. Bold values exceed the MCL.

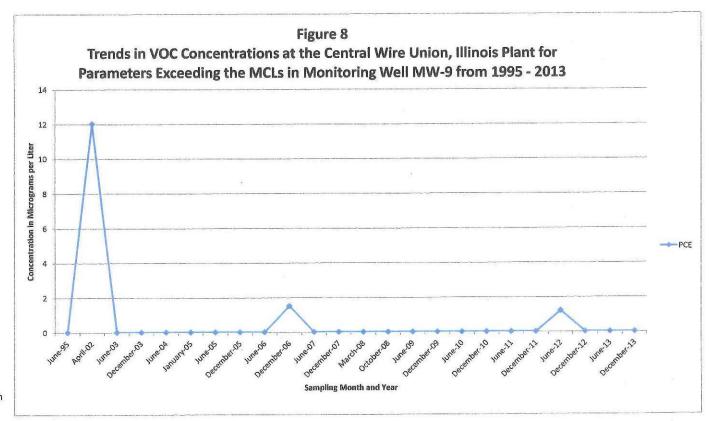
Figure 7
Trends in VOC Concentrations at the Central Wire Union, Illinois Plant for Parameters Exceeding the MCLs in Monitoring Well MW-8 from 1995 - 2013



MW-9

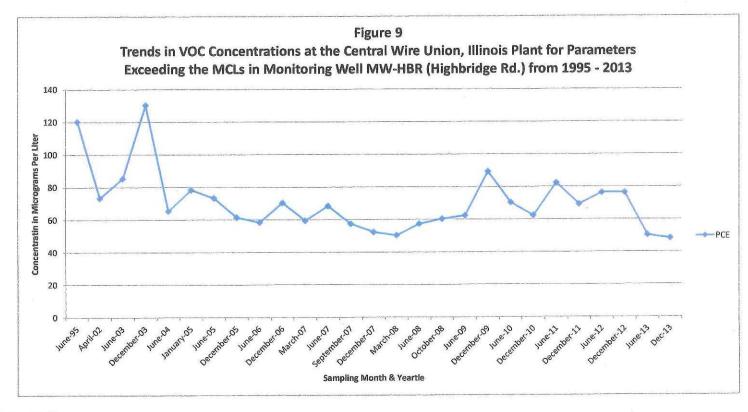
Time	PCE
June-95	0
April-02	12
June-03	0
December-03	0
June-04	0
January-05	0
June-05	0
December-05	- 0
June-06	0
December-06	1.5
June-07	0
December-07	0
March-08	0
October-08	0
June-09	0
December-09	0
June-10	0
December-10	0
June-11	0
December-11	0
June-12	1.2
December-12	0
June-13	0
December-13	0
MCL	5

Concentrations reported in micrograms per liter. Bold values exceed the MCL.



MW-HBR

10100-1715	11/
Date	PCE
June-95	120
April-02	73
June-03	85
December-03	130
June-04	65
January-05	78
June-05	73
December-05	61.1
June-06	58
December-06	70
March-07	59
June-07	68
September-07	57
December-07	52
March-08	50
June-08	57
October-08	60
June-09	62
December-09	89
June-10	70
December-10	62
June-11	82
December-11	69
June-12	76
December-12	76
June-13	50
Dec-13	48
MCL	5

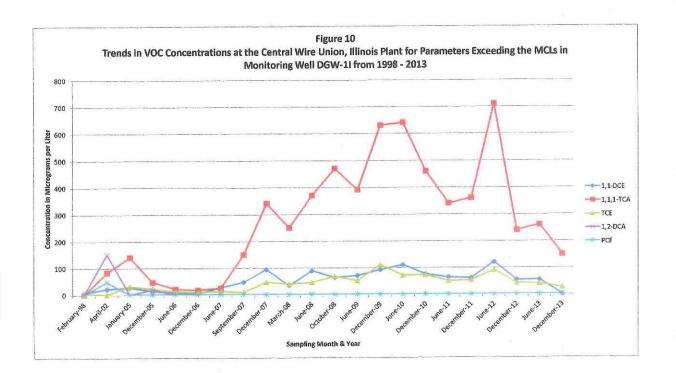


Concentrations reported in micrograms per liter. Bold values exceed the MCL. EPA Method 8260B was run. Only chemicals with detections above the MCLs were plotted.

DGW-1I					
Time	1,1-DCE	1,1,1-TCA	TCE	1,2-DCA	PCE
February-98	6	0	4	0.6	0
April-02	21	83	9 J	150	47
January-05	26	140	31	0	0
December-05	13.6	47.2	21.6	18.4	0
June-06	6.9	22	12	0	0
December-06	4.6	18	9.7	0	0
June-07	26	26	13	0	0
September-07	46	150	8.9	0	0
December-07	93	340	46	0	0
March-08	33	250	39	0	0
June-08	88	370	45	0	0
October-08	63	470	68	0	0
June-09	70	390	51	0	0
December-09	91	630	110	0	0
June-10	110	640	71	0	0
December-10	75	460	72	0	0
June-11	63	340	50	0	0
December-11	60	360	52	0	0
June-12	120	710	90	0	0
December-12	53	240	42	0	0
June-13	54	260	39	0	0
December-13	0	150	26	0	0
MCL	7	200	5	5	5

Concentrations reported in micrograms per liter.

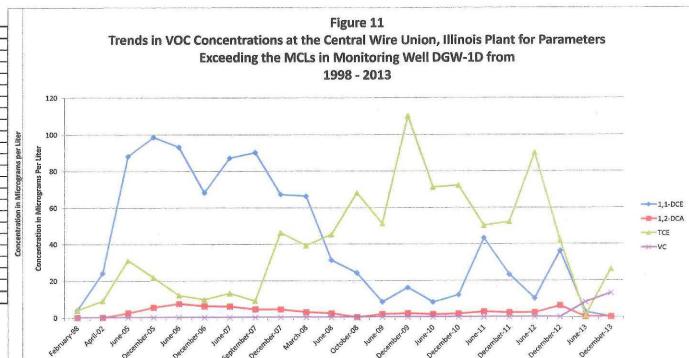
Bold values exceed the MCL.



Time	1,1-DCE	1,2-DCA	TCE	VC
February-98	4	0	4	0
April-02	24	0	9	0
June-05	88	2.5	31	0
December-05	98.4	5.5	21.6	0
June-06	93	7.46	12	0
December-06	68	6.2	9.7	0
June-07	.87	6	13	0
September-07	90	4.4	8.9	0
December-07	67	4.3	46	0
March-08	66	2.8	39	0
June-08	31	2.2	45	0
October-08	24	0	68	0
June-09	8.2	1.7	51	0
December-09	16	2	110	0
June-10	8.1	1.5	71	0
December-10	12	1.8	72	0
June-11	43	2.9	50	0
December-11	23	2.4	52	0
June-12	10	2.4	90	0
December-12	36	6.2	42	0
June-13	2.6	0	0.67	8.1
December-13	0	0	26	13
Contract of the Contract of th	100			

Concentrations reported in micrograms per liter.

Bold values exceed the MCL.



Sent by Certified Mail #7009 1680 0000 7663 7992 and Electronic copy

May 30, 2014

Mr. Gerald Ruopp Techalloy Company, Inc. 6509 Olson Road Union, Illinois 60180

United State Environmental Protection Agency's Comments on the 2012 RCRA Corrective Measures Implementation Status Report Revision 1 April 2014, EPA ID # ILD 005 178 975, Administrative Order on Consent (AOC), Docket No. R8H-5-99-008

Dear Mr. Ruopp,

This letter provides the United States Environmental Protection Agency (EPA) comments on the 2012 RCRA Corrective Measures Implementation Status Report, Revision 1, April 2014, for the Techalloy facility in Union, Illinois prepared by Autumwood ESH Consultants, LLC (Autumnwood) dated March 31, 2014. EPA's comments are:

General Comment: Whenever a synonym is used in a figure, provide a key of synonyms used. A figure or chart is a stand-alone document. All figures and charts require a title and legend.

RESPONSE TO COMMENTS DOCUMENT

Comment 1. It appears EPA was miss interpreted with this comment. The original version of the report contained incorrect information on how the residential wells were sampled. EPA's comment was meant to require that Autumwood delete the inaccurate information and REPLACE IT with accurate information on the residential well sampling. It appears that all Autumwood did was delete the inaccurate information. As a result, there is no mention of specifics of the residential well sampling, and only an oblique mention that residential well sampling even occurred. Discussion of the residential well sampling is necessary to assessing site conditions.

EPA suggests the report be revised to include something like the following:

"Residential-well samples were typically collected form spigots outside the home that were not in-line with treatment systems. Residential wells were purged for approximately 5 minutes at an unrecorded flow rate prior to sample collection. Field parameters were measured at the time of sample collection using a (name and model of field parameter measuring device)".

Techalloy should verify the correctness of this statement before adding it to the text.

Comment 2. Figure 5-7.

- 1. Minor points, but protocol usually requires cross-sections be done this way: y-axis should range from 720-840 feet (ft.). X-axis should start at zero (0) and A, and not have an offset to the left. X-axis should end at A' and 8,000, and not have an offset to the right of 7,500 ft.
- 2. There are no values given for the concentration contours. Every contour should have an assigned value shown on the figure.
- 3. There needs to be a legend describing what is being contoured--total concentration of volatile organic compounds (VOCs)? Concentration of some specific compound(s)? What compound(s)?
- 4. In a related vein, what constitutes the "Extent(s)" of the plume? Non-detect (ND)? 1 part per billion (ppb)? Maximum contaminate level (MCL) exceedences? If so, which MCL? This lowest value needs to be defined in the appropriate figures because depending on the value the contouring may need to be revised.
- 5. Suggest "Extent" of plume, not "Extents".
- 6. Add a Legend/expand General Notes explaining what the various symbols used in the report are--depth of well boring, elevation of water table, geologic contact, location of well screen, line of equal concentration of total volatile organic compounds with identification of contour interval, concentration of compounds at well in micrograms per liter, trichloroethene (TCE), etc. Much of what Autumwood presents in Figure 5-6 could be applied to update this figure.
- 7. It's likely the bottom of the plume corresponds to the top of the silty clay layer. Suggest the figure be revised accordingly.
- 8. Autumwood should examine the Weston cross sections they submitted as a partial guide for what is being requested.
- 9. The data for the two Geoprobe locations near the Kiswaukee River should be included in this and all other figures showing contaminant distribution in map view. Omitting these data point's results in a depiction of the plume that is erroneously small.

Comment 3. Will comment on the individual figures as mentioned. Figure 5-1.

- 1. Suggest contouring go to either 1 ppb or non-detect. Stopping at 50 ppb leaves a fair amount of room for MCL exceedences to be left out of the contouring, which gives an underestimation of the extent of the problem. For example, the area of MCL exceedences for tetrachloroethylene (PCE) at MW-4 isn't in the "plume" when it should be.
- 2. Concentration values for the contours are reasonably easy to determine in this figure for the most part, but the General Notes should include a mention of the contour interval (50 ppb) for ease of analysis. EPA suggest something like "---50--- Line of equal

Nordine, John

From:

Jack Thorsen <jack@autumnwoodesh.com>

Sent:

Thursday, June 26, 2014 12:53 PM

To:

Nordine, John; 'Robert Kay'

Cc:

Gerald Ruopp

Subject:

FW: Central Wire question on EPA comments

John & Bob:

Steve's questions are attached. Unfortunately he is not available today. However he and I have talked about these questions a couple of times.

Regards,

Jack

John W. Thorsen, P.E. Autumnwood ESH Consultants 262.237,1130

From: GrantECC [mailto:Steve.Grant@GrantECC.com]

Sent: Monday, June 16, 2014 8:55 AM

To: Jack Thorsen

Subject: Central Wire question on EPA comments

Jack,

I have some questions and comments on the comments:

Comment 2:

3./6. It sounds like they want me to put the legend from the cover sheet on every sheet?

9. I don't have this data. He does now.

Comment 3:

Figure 5.1 The line is so small it's close to impossible to make visible, but I'll do what I can and most likely need to stretch the lines bigger than they calculate too.

Figure 5-5 2. Once again just trying to keep it legible, but will change as above.

Figure 5-6 2. This figure was intended as a cover sheet for the cross-section to not clutter the drawings (i.e., civil drafting techniques). I should be able to put all of the drawings on 11x17 and hopefully fit this information as required per drawing.

Figure 5-7,5-8 3. I'm completely missing where the contouring is wrong in these, if any one can point it out I'd be grateful. The only thing I can assume is that they want these figures as fence diagrams instead of cross sections. If this is the case I can redraw them but it will make the plume appear bigger than it actually is.

Regards,

Steve Grant, PE Grant Environmental and Civil Consulting LLC www.grantecc.com Phone 224-544-5364

Nordine, John

From: Sent: Kay, Robert <rtkay@usgs.gov>

Jent

Wednesday, May 21, 2014 4:43 PM

To:

Nordine, John

Subject:

April 15, 2014 submittal on 2012 Corrective Measures Status Report, Techalloy Site

John--enclosed is my review of Techalloy's 4/15/14 submittal of responses and corrections to USEPA comments on the 2012 RCRA Corrective Measures Implementation Status Report, Revision 1, for the Techalloy facility in Union, Illinois.

General Comment: The adequacy of the revised document cannot be adequately evaluated with this partial resubmission. The entire revised document should be re-submitted, rather than the bits and pieces presented here.

RESPONSE TO COMMENTS DOCUMENT

Comment 1. It appears I din't make myself sufficiently clear with this comment. The original version of the report contained incorrect information on how the residential wells were sampled. My comment was meant to require that Autumwood delete the inaccurate information and REPLACE IT with accurate information on the residential well sampling. It appears that all Autumwood did was delete the inaccurate information. As a result, there is no mention of specifics of the residential well sampling, and only an oblique mention that residential well sampling even occurred. Discussion of the residential well smapling is necessary to assessing site conditions. I suggest the report be revised to include something like the following text.

"Residential-well samples were typically collected form spigots outside the home that were not in-line with treatment systems. Residential wells were purged for approximately 5 minutes at an unrecorded flow rate prior to sample collection. Field parameters were measured at the time of sample collection using a (name and model of field parameter measuring device)".

Techalloy should verify the correctness of this statement before adding it to the text.

Comment 2. Figure 5-7.

- a. Minor points but y-axis should range from 720-840 ft. x-axis should start at 0 and A, and not have an offset to the left. x-axis should end at A' and 8,000, and not have an offset to the right of 7,500 ft. Not a big deal if you don't want to forward this comment, but protocol usually requires cross-sections be done per my suggestions.
- b. There are no values given for the concentration contours. Every contour should have an assigned value shown on the figure.
- c. There needs to be a legend describing what is being contoured--total concentration of VOCs? Concentration of some specific compound(s)? what compound(s)?
- d. In a related vein, what constitutes the "Extent(s)" of the plume? non-detect? 1 ppb? MCL exceedence? if so, which MCL? This lowest value needs to be defined in the appropriate figures because depending on the value the contouring may need to be revised.
- e. Suggest "Extent" of plume, not "Extents".
- f. Add a Legend/expand General Notes explaining what the various symbols used in the report are--depth of well boring, elevation of water table, geologic contact, location of well screen, line of equal concentration of total volatile organic compounds with identification of contour interval, concentration of compounds at well in

micrograms per liter, TCE-trichlorethene, etc. Much of what Autumwood presents in figure 5-6 could be applied to update this figure.

- g. It's likely the bottom of the plume corresponds to the top of the silty clay layer. Suggest the figure be revised accordingly.
- h. Autumwood should examine the Weston cross sections they submitted as a partial guide for what is being requested.
- i. The data for the two Geoprobe locations near the Kiswaukee River (I forget the numbers) should be included in this and all other figures showing contaminant distribution in map view. Omitting these data points results in a depiction of the plume that is erroneously small.

Comment 3. Will comment on the individual figures mentioned. fig. 5-1.

- a. Suggest contouring go to either 1 ppb or non-detect. Stopping at 50 ppb leaves a fair amount of room for MCL exceedences to be left out of the contouring, which gives a underestimation of the extent of the problem. For example, the area of MCL exceedence for PCE at MW-4 isn't in the "plume" when it should be.
- b. Concentration values for the contours are reasonably easy to determine in this figure for the most part, but the General Notes should include a mention of the contour interval (50 ppb) for ease of analysis. I suggest something like "---50--- Line of equal concentration of total volatile organic compounds. Contour interval 50 micrograms per liter."
- c. The contour around DGW1 should be 500 ppb. The contouring currently on the figure suggests it's 450 ppb.
- d. Fully describe in the General Notes the water-level contours, including the date the water levels were taken. Something along the lines of "---820--- Water table altitude, in feet above Mean Sea Level, December 2012. Contour interval 1 ft".

fig. 5-5.

- a. Comments on figure 5-1 apply here and the appropriate changes should be made to this figure. By not contouring to ND, this figure more or less ignores the TCA near the plant, which is important to understanding the plume even if concentrations are low.
- b. As near as I can tell from the two contours that are actually defined (20 and 100) the contour interval is 20 ppb. This interval puts the contours at DGW1 (shows 120-140, should be 140-160) and GP3 (shows less than 200, should be 200-220) in the wrong places. Either the contouring is off in the vicinity of DGW1 and GP3 or the contour intervals are inconsistent. In any event, the contours need to be labelled and the contouring needs to be accurate.

Figure 5-6.

- a. Autumwood needs to decide what they wish to show on this figure. Much of what is presented isn't necessary for this figure to convey the location of the lines of cross section. I have no objection to Autumwood adding plumes and groundwater contours to the figure, but they aren't necessary.
- b. Much, not all, of the information in the upper left corner and in the General Notes is not pertinent to this figure. Depending on what it ultimately shown on this figure, Autumwood should retain the pertinent information (at least the well and Geoprobe symbols and the line of section) and consolidate the explanation in either the upper left side of the figure or in the General Notes. All extraneous information (Geology, VOC abbreviations, etc.) should be deleted.
- c. Comments on figure 5-1 may be pertinent, depending on the final content of the figure.

Figure 5-8.

- a. Comments on figure 5-7, except for comment b, apply here.
- b. Title in uninformative and should be revised.
- c. Contouring REMAINS incorrect in section B-B'. Depending on how the extent of the plume is defined, contouring may be incorrect on section C-C'.

Comment 4. OK

Comment 5.

- a. Actually adding a title that enables the reader to determine that this document is Appendix 3 would make this document more useful.
- b. Most of what we asked for has not been added to the table. We can discuss data gaps, but Autumwood should already know things like well diameter and depth of screened interval.

Comment 6.

a. We asked for the dates of measurements for ALL water levels in every well, not just the most recent. Presumably Autumwood has this information somewhere in one of their files. If not, this information needs to be compiled to ensure we can assess if flow directions change through time.

REVISED PAGES 11 AND 12 OF THE REVISED STATUS REPORT See response to comment 1.

Robert T. Kay U.S. Geological Survey 650G Peace Road DeKalb, IL 60115 815-752-2041 rtkay@usgs.gov